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(54) **A radio communication system**

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## Description

### BACKGROUND OF THE INVENTION

This invention relates to radio communication systems and a portable telephone therefor, having functions of personal portable wireless terminals (hereinafter referred to as portable terminals), e.g. of a scheduling manager and an address book manager.

As a small size portable computer (or electric note book) having the function of scheduling manager, there is known an electronic scheduler as disclosed in, for example, JP-A-62 143 171. This electronic scheduler has the function that the private schedules inputted by its owner, operator or user are stored as data and that later, a key word such as date or matter (event) is used for the search of the corresponding data of the schedules, then the data being displayed. There is another small size portable computer (electric note book) which has, in addition to the schedule managing function mentioned above, the function that desired data of telephone numbers, an address book and so on are previously stored and are, if necessary, read by use of various kinds of key words and displayed. It has a pocket size shape and thus it is becoming a necessary article for the businessmen in place of the usual note book.

The indoor or limited area radio telephone system to which the conventional cordless telephone has developed is described in the paper, No. 438, page 2-256 (1986) of the 1986-all-Japan meeting of the Institute of Electronics and Communication Engineers of Japan, section of communication. This system solved the problem that cordless telephones are limited only to the use in a narrow range because they are connected to a particular base station, or it has the feature that the cordless telephones can be connected to unspecified base stations under the control of PBX (private branch exchange) so that the user can call a telephone at any place within the yard. If each person always carries his own small size wireless telephone of this type, each person at a given place can freely call other persons or can be freely called by other persons. Thus, it is possible to call any person by use of a particular wire telephone installed at a particular place and directly call a particular person by use of a wireless telephone.

A wireless telephone system for voice and data communication according to the first part of claims 1 and 15 is disclosed in WO 86/00775.

The conventional small size portable computer (or electric note book) mentioned above, however, stores only private schedules or the like, and thus has a limited advantage.

We will now consider, for example, the function of a scheduler. When we try to make previous arrangements or call a conference, we first check the schedules of persons who are to attend, select the dates on which the attendants are free, and then fix appointments with the attendants, before making the schedule for the

meeting. In addition, we send invitation notes in which the contents of the schedule are written, to the persons to attend, and record the contents of the schedule on our note or the like. Thus, the conventional electric note book which stores only the private schedules is not useful when we make a schedule for a conference. That is, we must be helped by another in collecting the schedules of the persons to attend, adjusting and fixing the date of the conference and sending the invitation note to the respective attendants, which operations take much time and labor. In other words, the conventional electric note book has only the function of storing the result of having fixed a schedule, or the function of the usual note book, and does not have such function as to utilize the data stored in the electric note books of other persons.

We will next consider the memo function. The telephone numbers, an address book and so on must be inputted by human hands, which operation is troublesome.

Moreover, precious data stored with much labor may be lost by erroneous operation (for example, resetting) of the electric note book or missing of itself. The loss of such information may bring the businessman into much serious situation.

Also, in the indoor radio telephone system mentioned above, when an owner of a radio telephone is directly called by another radio telephone, calling and being called occur at arbitrary places within the yard, for example, at a place where a meeting is being conducted, under which situation the ringing from the telephone may disturb the meeting. In this case, most telephone calls will probably need no emergency, and thus a speech or voice message (for example, automatic answering telephone) will satisfy such communication as the telephone call. The speech or voice communication may be unnecessary depending on the contents, but may often be replaced by a memo in which case the electric mail or the like may be used. In addition to the present speech communication accompanied with ringing, this nonringing communication can be introduced to enable the choice of a communication mode matched with time, place and situation, thus reducing useless calls.

A method of switching among the communication modes and control of the forbidden level depending on the contents of a meeting is necessary. At each time of movement to a certain place, these must be changed by key input with much labor and time taken, which fact may cause the user to forget the switching of communication modes.

### SUMMARY OF THE INVENTION

It is an object of the invention to provide a radio communication system which enables a plurality of portable telephones to use information from each telephone. This object is solved by the system set forth in claim 1

to 15. Portable telephones for use in such a system are set forth in claims 9 and 16.

The radio communication system of a preferred embodiment comprises a plurality of portable telephones functioning as portable terminals, relay means for communicating with the respective portable terminals, and a data processing unit connected to the relay means, each portable terminal having voice input/output means and data input/output means and which can communicate with other portable terminals or the data processing unit through the relay means.

Specifically, the portable terminal has a memory for storing the data inputted through data input means, and another memory for monitoring the data change within the first-mentioned memory, reading the changed data and storing it, the changed data being automatically transmitted to the data processing unit.

Also, the data processing unit, at each certain period, requests each portable terminal to send data within the memory, controls storage means to store the received data from each portable terminal, and transmits necessary data to a portable terminal in accordance with the request from the portable terminal.

In that case, the portable terminal may transmit information including the data and pass word previously inputted through the data input/output means to the data processing unit, while the data processing unit may store the transmitted information in storage means, and transmit the data only when a request including a predetermined pass word is sent from the portable terminal.

Also, the data processing unit stores received data from each portable terminal in the memory, processes the data stored in the memory in accordance with the request from the terminal, and transmits the processed result to each specified terminal.

The owner of each portable terminal having the above-mentioned function can make telephone communication with a person having another portable terminal and make data communication with the data processing unit. Also, since each portable terminal causes the data processing unit to automatically store the inputted and stored data (for example, each time the data in the memory within the terminal changes) or store the data in a certain period (for example, in a time band such as midnight except the busy hour band), the owner of each terminal is not required to send the data by his manual operation, but the data from each portable terminal can be transmitted to the data processing unit.

Moreover, since the data processing unit functions as the backup unit for each terminal, missing of a portable terminal from its owner, for example, will result in no trouble because necessary data can be read by another portable terminal.

In addition, when data is registered in the data processing unit, a pass word is attached to the data, so that the data processing unit can answer the request for reading data, from a portable terminal only when the specified data includes that pass word. Therefore, the

data reading can be prevented from being made by a malicious third party.

Also, the data processing unit controls the memory to store the received data from each portable terminal, processes the data in the storage means in accordance with the demand from a certain portable terminal (for example, a request for fixing a meeting as will be described with reference to Fig. 6 and the following), and transmits the result of the processing (for example, a notice of opening the meeting) to specified portable terminals, thus the data inputted in each portable terminal being used by each other.

In order to achieve an automatic switching of a receiving mode, each portable terminal is constructed to have clock means, means for setting schedules, and means for switching the receiving modes so that a receiving modes can be automatically selected in accordance with the contents of a fixed schedule and the present time.

The contents of the fixed schedule includes, for example, the time when a conference is started, the time when it is concluded, the conference room (place), the incoming restriction level for controlling the transmission modes, the outgoing restriction level for controlling the receiving modes, and so on.

In order to regulate free calls from other subscribers, a radio base station which covers a special area such as a conference room in which the incoming and outgoing calls must be regulated, broadcasts the signal for identifying the base station (hereinafter, referred to as the base station ID) and flags (outgoing call control flag and incoming call control flag) indicating the previously set incoming restriction level and outgoing restriction level, and each portable terminal selects a receiving mode according to the contents of the fixed schedule and the contents of the signal from the base station.

In that case, the portable terminal recognizes its present location from the base station ID broadcasted from the base station and the base station ID vs. location table previously stored in the internal memory, and selects either the receiving mode determined on the basis of the schedule or the receiving mode determined on the basis of the information from the base station in accordance with the present location.

When the present location is different from the location set in the schedule, the portable terminal produces an alarm, or when receiving an emergent signal from the base station, the portable terminal selects a predetermined receiving mode in place of the receiving mode selected as described above.

The portable terminal of the preferred embodiment automatically selects a receiving mode in accordance with the present time and the contents of the schedule, and thus does not need a complicated switching operation for switching receiving modes.

Moreover, since the contents of the fixed schedule includes, for example, the time when a conference is started, by the incoming restriction levels for regulating

the receiving modes, unnecessary calls during the conference can be limited.

When the present location is different from the location set in the schedule at the present time, the portable terminal produces an alarm, and thus it is useful for its owner to make schedule control. If the owner has forgotten a meeting which he is to attend, the alarm from the portable terminal informs him of the meeting.

The foregoing and other objects, advantages, manner of operation and novel features of the present invention will be understood from the following detailed description when read in connection with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a first radio communication system according to this invention;

Fig. 2 is a block diagram of a first portable terminal;

Fig. 3 is a block diagram of the base station;

Fig. 4 is a block diagram of a communication controller;

Fig. 5 shows an external appearance of the portable terminal according to this invention;

Fig. 6 is a diagram useful for explaining the input procedure for preparing a draft of the group scheduling;

Fig. 7 is a diagram useful for explaining the procedure for the input confirmation at the time of preparing the draft;

Fig. 8 shows schedules for respective persons who will attend a meeting;

Fig. 9 shows an example of the notice of a conference;

Fig. 10 is a diagram useful for explaining the procedure for specifying the date of a schedule to be displayed;

Fig. 11 shows an example of the displayed schedule at the date specified in Fig. 10;

Fig. 12 shows an example of the display of fixed schedules;

Fig. 13 is a block diagram of a second radio communication system according to this invention;

Fig. 14 shows the format of a location information signal broadcast from the radio base station;

Fig. 15 is a block diagram of a second portable terminal of the invention;

Fig. 16 is a schematical view of a control program for the portable terminal;

Fig. 17 shows a memory map of a RAM of the portable terminal;

Fig. 18 is a flowchart of the location monitor program for the portable terminal;

Fig. 19 is a diagram useful for explaining an example of the input of schedules;

Fig. 20 shows the relation between the communication restriction and the communication modes;

Fig. 21 shows the communication of restriction flag

storage area;

Fig. 22 shows the relation between the restriction by scheduling and the restriction by location;

Fig. 23 is a flowchart for the operation at the time of an incoming call;

Fig. 24 is a flowchart for the selection of an incoming call restriction;

Fig. 25 shows the communication between the calling side and the called side; and

Fig. 26 is a flowchart for the operation of the alarm in a schedule.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the invention will be described with reference to a system which is assumed to be installed in an indoor office environment. Fig. 1 is a block diagram of a first radio communication system of this invention. In Fig. 1, there are shown portable wireless terminals 1 (hereinafter, referred to simply as the terminals) each having a radio transiver function and which can be carried within the office. The internal details of this terminal will be mentioned later with reference to Fig. 2. Shown at 2 is a data processing unit for controlling the whole system, and at 3 are base stations which are coupled by a radio wave to the terminals 1 and which are provided on, for example, the walls or ceilings of the office. The places in which the base stations are installed, and the number of the base stations are determined by the space of the office and the distance which the radio wave can reach, in order that the terminals are able to communicate with any one of the base stations whenever the terminals are located at any positions within the service area of the office. Shown at 4 is a communication controller for controlling communication channels to be set or opened between the data processing unit and the base stations. When the terminals are used as telephones, the communication controller 4 functions as a private branch exchange. Shown at 6 are transmit-receive antennas of the base stations, for example, whip antennas. Shown at 7 is a connection line (interface) for use in exchanging data between the communication controller 4 and the data processing unit 2. For example, an RC-232C interface is used therefor. Shown at 8 are connection lines for connecting the communication controller to other systems. The connection lines 8 are directly connected to the public telephone network. Thus, the system of this invention can be connected through the public telephone network to a system installed in a remote office. When the terminals are used as telephones, the connection lines 8 are used as normal connection lines to the public telephone network. The number of circuits, or channels is set within the range of, for example, several to several tens matched to the amount of traffic.

Fig. 2 is a block diagram of the terminal 1 shown in Fig. 1. In Fig. 2, there is shown a transmitting circuit 101,

in which a carrier signal (of a frequency of, for example, 240 MHz band) from a synthesizer 105 is frequency-modulated by an analog signal (of, for example, 0.3 to 3.4 KHz) from a modem 106 or a voice circuit 125, and the modulated signal is amplified to a predetermined power (for example, 10 mW) and transmitted. The transmitting circuit 101 has in its output section a switch (not shown) which is operated by a carrier ON/OFF signal from a radio controller 107 so that unnecessary radio waves are not produced in the standby mode. Shown at 102 is a receiving circuit which amplifies a weak signal of a receive frequency band (for example, 380 MHz band), and demodulates the FM signal into an analog signal as the transmitted information. Shown at 103 is a branching filter for enabling an antenna to be used for both transmitting and receiving. Shown at 104 is a whip or built-in antenna. The frequency synthesizer 105 is ordered by the radio controller 107, to determine transmission and reception frequencies, or transmission and reception channels and to supply local oscillation frequencies to the transmitting circuit 101 and to the receiving circuit 102. The modem 106 is ordered by the radio controller 107, to modulate digital data (for example, 1, 0, 1, 1, ...) being transmitted, into, for example, a sine wave of 1200 Hz (for example, MSK, or minimum shift keying modulation) and to demodulate the received modulated wave into the original digital information. The radio controller 107 controls channel setting and opening procedure, exchange of digital information with the base station, specifying channels (controlling the synthesizer 105 to specify a frequency), and on/off of the carrier. Shown at 110 is a communication mode control circuit which controls the switching of telephone/voice message/secretarial service function. Shown at 111 is a secretarial service function control circuit which comprises a microcomputer and a program memory. Shown at 112 is a timer which indicates the present year, month, day, hour, minute, and second. Shown at 113 is a temporary memory for information being transmitted. This memory is used for temporarily storing the data of another memory existing within the terminal when it is transmitted to the data processing unit. Further details will be described later together with the basic operation of this system. Shown at 114 is an address book memorizing circuit, and at 115 is an electric mail memorizing circuit, which stores letter information transmitted on a communication channel. Shown at 116 is a schedule memorizing circuit, which has a function for storing the schedule of the owner of the terminal and part of the schedules of the subscribers of the system as will be described later in the application of this embodiment. Shown at 117 is a key input section, at 118 is a key input circuit, and 119 is a display which is, for example, of liquid crystal indication type for small size and low power consumption.

The display 119 is driven by a display driver 120.

Shown at 121 to 124 are analog switches for preventing the speaker from emanating unnecessary

sound and the microphone from picking up undesired signals except when the terminal is used as a telephone. These switches are controlled by the communication mode control circuit 110. Shown at 125 is a voice circuit which is of the same construction as within the normal telephone set. Shown at 126 is the speaker (or earphone), and at 127 is the microphone. Shown at 128 is a voice message recording circuit which includes, for example, a small-sized tape recorder or an analog/digital converter and a semiconductor memory.

Fig. 3 is a block diagram of the base station 3 shown in Fig. 1. In Fig. 3, there are shown a transmitting circuit 301, a receiving circuit 302, a branching filter 303, an antenna 6, a synthesizer 305, a modem 306, and a radio circuit controller 307, which have the same functions as the circuits 101 to 107 included in the terminal 2 mentioned with reference to Fig. 2 and thus will not be described. The modem 308 has the function of modulating a signal which is produced from the radio circuit controller 307 and which orders to set and open the channel to the communication controller 4, into digital information and has the function of demodulating the digital signal incoming from the communication controller 4 into information of channel setting and opening, ID number of the terminal to be called, and so on. After the channel is set, the signal from the terminal 1 to the communication controller 4 is transmitted through the transmitting and receiving circuits 301 and 302 of the base station and directly through a hybrid 309.

Fig. 4 is a block diagram of the communication controller 4 (Fig. 1). In Fig. 4, a signal transmitted from the base station 3 is supplied through the connection line 5 to a hybrid 401 where it is given a path to a modem 402. This signal is then converted by the modem 402 into a digital signal. Shown at 403 is an interface for establishing communication path which checks the call initiating request signal and identification code from the terminal 1. This interface for establishing communication path, 403 has the function of transmitting an outgoing call request or the identification code of the terminal being called to the base station 3 by reference to the memory 411 of a switching controller 408 in which the identification code and the corresponding transmission address are stored. Shown at 404 is a secretarial service interface, which, after the channel setting procedure is completed, receives information from the terminal 1 through the interface 403 and transmits it to a secretarial service circuit bus 406 in a predetermined format. Shown at 405 is a connection portion to the base station 3. If necessary, a plurality of same ones may be provided, in which the respective interfaces for establishing communication path are connected to the switching controller 408 and in which the secretarial service interfaces are connected through the connection bus 406 to a data processing unit interface 407. Shown at 405' is the same as the connection portion 405 except the hybrid. This portion is provided for the communication with another system through the connection line 8. An exchanging

switch 409 connects other systems, connection trunks 410 (if necessary, a plurality of trunks are provided), and the portion 405', and serves as the normal private branch exchange when the terminals are used as telephones.

The basic operation of the radio communication system of this invention will be mentioned below.

A description is first made of the operation for setting and opening the communication channel between the multifunction terminal 1 and the data processing unit 2.

When the terminal 1 requests a communication channel to be established, to the data processing unit 2, a call initiation demand signal is transmitted on a preset radio control up-channel.

The neighboring base terminal which received the call initiation demand signal transmits a channel specifying signal for specifying a communication channel, to the terminal on a preset control down-channel.

In this way, radio up- and down-channels are established between the terminal and the base station in accordance with the specifying channel included in the channel specifying signal.

Moreover, the base station transmits a channel connection demand signal for requesting the channel connection, to the communication controller 4. The communication controller 4 which received this connection demand signal connects the base station and the data processing unit.

According to the above-mentioned procedure, bidirectional (up and down) communication channels are established between the terminal and the data processing unit.

A description is made of the case in which the data processing unit 2 specifies a particular terminal 1 and establishes a channel to the terminal.

The data processing unit transmits a signal including the identification code of the terminal to be specified, to the communication controller 4. The communication controller 4 which received the signal, selects the neighboring base station associated with the specified terminal by reference to the memory 411 in which the relation between a plurality of terminals and base stations near the terminals is registered, and then transmits an incoming call request signal including the identification code of the specified terminal.

The base station which received the incoming call request signal transmits a channel specifying signal including the identification code of the specified terminal on the radio control down-channel.

The terminal always monitors the signal on the control down-channel in the standby mode (when not communicated), and thus when the identification code included in the signal coincides that of its own terminal, it receives that signal and establishes a receiving channel.

By the above procedure, the communication channel is established between the data processing unit 2

and the terminal 1.

When the relation between a plurality of terminals and neighboring base stations associated with the terminals is registered in the memory 411 within the communication controller, the following procedure, for example, is taken.

First, each terminal sends a signal including the identification code of its own terminal (locate registration signal) on the control up-channel in the standby mode.

The sending of the signal may be made during predetermined period or by the owner's operation at the terminal.

The base station which received the locate registration signal transmits the identification code of the terminal included in that signal and the signal including its own identification code to the communication controller 4.

The communication controller 4 which received the signal from each base station controls the memory to store the relations between the identification codes of the terminals in the signal and the identification codes of the base stations. When two or more signals include the identification code of the same terminal, it is possible that the base station which received the locate registration signal transmits the strength of received signal in addition to the identification code to the communication controller 4, and that the communication controller 4 controls only a signal of greater strength to be registered. Thus, wherever each terminal is moved, it can be communicated with the base station as long as the base station is located within the range which the radio wave can reach.

After the channel is established between the terminal and the data processing unit, the bidirectional communication therebetween can be made by a predetermined procedure.

When the communication is completed, and the channel is desired to be opened, the central processing unit issues a command to stop the radio transmission from the base station and then open the channel connection to the communication controller. The terminal, when it detects that the transmission of signals is stopped from the base station, stops the transmission after a predetermined card time (for example, 2 seconds), and waits in the standby mode.

A description will be made of the operation for supplying data within the terminal into the memory 202 of the data processing unit.

It is assumed that data is inputted through the terminal keyboard 117 (Fig. 2) and that the data within the terminal is changed. When the internal data is changed, new data is written in the memory 130 (which includes circuits 114 to 116), or the previously stored data is updated or erased. In Fig. 2, when the data in the memory 130 is changed, or when new data is written in the memory 130 or when the previously stored data is updated or eliminated, the secretarial service circuit 111 controls the contents of data after the change and the address

of the data on the memory to be stored in the temporary memory 113. Then, the secretarial service circuit 111 inquires of the communication mode control circuit 110 about whether the communication channel setting is possible or not (because the telephone mode may now be operative) in order to establish a communication channel to the data processing unit. When the communication channel setting is possible, it issues the request for the communication channel setting to the communication mode control circuit 110. The radio controller 107 makes a calling procedure for treating the data processing unit as the called party, so that a channel is established between the terminal and the base station and that the terminal is connected through the communication controller to the data processing unit.

Then, the terminal sends a signal including the data of the memory 113 and the address on the memory circuit. When the channel setting interface 403 (Fig. 4) within the communication controller, when deciding that the called party included in that signal is the data processing unit, supplies the received signal (including data after change and address on the memory) from the modem 402 directly to the secretarial service interface 404 and then fed through the connection bus 406 and the data processing unit interface 407 to the data processing unit. Then, the data processing unit causes the data included in information from the terminal to be stored in the memory 202 at the corresponding address. Then, the data processing unit copies the stored data, and sends it back to the terminal. The terminal compares the data stored in the memory 113 with the data from the data processing unit, and when both are coincident, the terminal supplies a confirm comparison signal to eliminate the end communication protocol and data in the temporary memory 113. If both data are not coincident, the terminal sends the request for resetting the data stored in the storage portion within the data processing unit to the data processing unit, and again sends the data in the temporary memory 113.

The above operation is automatically made without requiring for the owner of the terminal to operate. During the data sending operation, the operator may be informed by a display or lamp that the communication is being made, or of the criterion of normal operation.

The secretarial service circuit 111 utilizes, for example, the following data flag in order to detect the change of data on the memory 130 (writing new data, updating, elimination of data, and so on).

When new data is inputted through the keyboard 117, or the data previously stored in the memory 130 is read out and updated, the control circuit 111 adds a data flag to the inputted or updated data, and controls the memory 130 to store it.

The control circuit 111 detects the change of data within the memory 130, but concretely it detects the data added with the data flag. Thus, the control circuit 111 recognizes the data added with the data flag as "changed data", and transmits it to the data processing

unit.

Then, the data processing unit controls the memory 202 to store "changed data" transmitted from the terminal and the copied data to send back to the terminal. The terminal makes the above-mentioned comparison.

If the data are coincident as a result of the data comparison, the control circuit 111 resets the data flag of the corresponding data on the memory 130, transmits the comparison confirmation signal mentioned above, resets the data on the temporary memory 113, and makes the talk end procedure.

Thus, if the data flag is added upon input of data or upon updating, the change of data within the memory can be easily detected.

Moreover, the owner of the terminal may desire that the input data not be transmitted to the data processing unit because the data may be appropriated by a third person.

In such case, the following different data flags, for example, are used.

When the owner of the terminal gives predetermined instructions (operations) after inputting data, the control circuit 111 adds the data flag (second data flag) indicating "to inhibit the transmission to the data processing unit" to the inputted data, and causes it to be stored in the memory 130.

The control circuit controls the data within the memory to be automatically transmitted, but the data added with the second data flag not to be transmitted.

Therefore, the owner is able to designate data which is inhibited from being transmitted to the data processing unit in accordance with the situations such as security.

Thirdly, the operation for using the terminal as a telephone will be mentioned.

When the keyboard 117 (Fig. 2) is operated to designate the telephone mode, the secretarial service circuit 111 sets the communication mode control circuit in the telephone mode. Then, a request for calling is sent to the radio controller so that a radio channel is established between the terminal and the base station. The secretarial service circuit 111 regards the numerical input from the keyboard as a dial number, and sends the signal including the dial number through the modem to the communication controller. The address book memory may be used to easily provide the functions of auto-dialer and abbreviated dialing.

Fourthly, a description will be made of the operation for the comparison between the terminal backup data within the data processing unit and the terminal internal data which is carried out in a specified time period.

Referring to Fig. 1, when it comes the time set within the data processing unit 2 (for example, 0 a.m. to 3 a.m. in the midnight), the data processing unit causes the communication controller to start the auto incoming motion for individually calling each terminal. The procedure for setting channels is the same as the call initiation procedure on the terminal side, and thus will not be de-



scribed. When the called terminal is ordered by the data processing unit to compare data, it checks if the secretarial service circuit 111 within the terminal can accept the data comparing operation. If it can accept, the secretarial service circuit 111 transmits this situation to the data processing unit 2. Then, the data processing unit 2 orders the terminal 1 to transmit the internal data together with the corresponding address in turn. The terminal transmits data in a predetermined memory 114 to 116 together with the address under the control of the secretarial service circuit 111. The data processing unit 2 compares the data from the terminal with the data stored in the memory 202 at each address unit. When the data from the terminal and the data stored in the memory are coincident, the data processing unit 2 sends a confirmation signal to the terminal. Then, the terminal transmits the data of the next address. If the data processing unit 2 detects any discord in the data, it updates the data in the memory 202 into the data received from the terminal or may send the information of the command in a form of electric mail to the terminal, which causes the electric mail memorizing circuit to store it and which waits for the terminal owner to give suitable instructions.

It is also possible to modify the data on the memory 202 into new data at that time by, for example, comparing the time preset in data without waiting for the instructions from the terminal owner. If those preset times are coincident, information of the coincidence in data may be sent to the terminal.

Moreover, the data processing unit may simultaneously perform the comparing operations for a plurality of terminals in a time sharing manner. The time taken to make the comparing operation for each terminal will be about 10 minutes if the data speed on the communication channel is 1200 b/s (the actual possible data speed on the communication channel is 2400 b/s, and in order to reduce the transmission error in the transmission line or to prevent the malfunction of the system due to the transmission error, it is necessary to provide the error correction function and the detection function. To this end, in this embodiment, the substantial data speed is selected to be half the value, 2400 b/s) and if the amount of data within the terminal is 100 K bytes.

When the number of terminals is larger than several tens or one hundred, it is desired that the comparing operation be made in a time sharing manner. In this case, if the number of the terminals for which the comparing operation is made in a time sharing manner is about ten, the total time to be taken for the completion of all comparing operations will be about 2 hours in the midnight time zone.

As described above, the data stored in the memory of each terminal is stored in the memory within the data processing unit. Therefore, the owner of each terminal can obtain particular data from the data processing unit by designating the names of desired recorded data.

In addition, when inputting of data is made at the

terminal, it is possible that a pass word is also inputted, and that the data and the pass word are registered in the memory 202 in accordance with the above-mentioned procedure. When data is obtained from the data processing unit, it is possible that a pass word is added to the read request signal and that the pass word and the request signal are transmitted to the data processing unit. In the data processing unit, the pass word of the specified data is read from the memory 202 and compared with that included in the read request signal, and only when they are coincident, the data can be read, thus reading by a malicious third party being prevented.

A description will be made of an example of the group scheduling application using this system.

Fig. 5 shows the layout of an electric secretarial terminal.

On one surface of the folding type terminal is provided a function key 158 and a communication mode key 152. The former is used for designating the modes other than the communication mode such as dictionary function and computation function. The latter is the key for selecting the communication function mode of the terminal, such as telephone, mail and schedule. An auxiliary menu indicator 153 indicates a concrete process for the selected mode. When any one of the communication modes is selected, it is indicated on a liquid crystal display 119. The auxiliary menu selection is performed by a cursor key 161. Shown at 159 is an alphanumeric input key by which the operator makes the input to the terminal. The liquid crystal display 119 indicates information of communication and the information inputted by the input key 159. The cursor key 161 makes scrolling of pages and movement of lines and letters. Shown at 156 is an execution key. When this key is depressed, the inputted information is registered for the terminal or transmitted. The earphone 126 and microphone 127 serve as the handset of telephone when the terminal is used as a telephone. A small loud speaker 160 emanates sound each time of key input and receiving, thereby stimulating the operator's attention. Shown at 104 is a built-in antenna for transmitting and receiving high-frequency signals between the terminals. A radio circuit 151 receives and demodulates a high-frequency signal and it modulates information made at the terminal, on a carrier and transmits the modulated signal. Shown at 162 is a cord reel for drawing the connection cord of the earphone 126 into the inside of the terminal. Shown at 150 is a power switch which has positions of ON, OFF and standby. For example, in the standby mode, receiving and answer-back for the signal can be permitted to reduce the power consumption.

A description will be made of the way to make schedule communication such as a meeting-open notice by use of communication terminals.

When "schedule" is selected by the communication mode key, preparation of draft, notice of schedule, indication of schedule and attendant search are displayed as an auxiliary menu on the lower side of the display.



The preparation of draft is necessary for knowing the persons who want to attend the meeting, the notice of schedule is for notifying each person of a fixed schedule, the indication of schedule is for displaying the schedule received by the notice of schedule or a schedule on a given day, and the attendant search is for checking the attendants in the meeting with the notified schedule.

First, the preparation of draft is selected. The input to the terminal is made on the display screen as shown in Fig. 6, in a conversational mode. The operator answers the question displayed. This conversational answer processing is made by the portable terminal mentioned above. The operator inputs the day for a meeting and the place of the meeting, the schedule name for determining the name of the meeting, the purpose of the meeting, the names of the expected attendants and the grade of importance in attending the meeting. The input to the terminal is made at each matter by depressing the execution key. The grade of importance in attending the meeting is divided into, for example, three ranks, I, II, and III in which order the grade of importance is increased. At the end of inputting these matters, when only the execution key is depressed with respect to one line on the display, the terminal regards this operation as the end of the input.

When all the matters have been inputted, they are indicated on the display of the terminal for the purpose of confirmation as shown in Fig. 7. The question of "Do you send this schedule ? Y/N" is indicated on the lower side of the display screen. If the operator requires no change of the indication, the key of Y is depressed, and if not so, the key of N is depressed. When Y-key is depressed, the terminal transmits this indicated information to the data processing unit. When N-key is depressed, the cursor key is operated to indicate the matter to be changed, and again inputting is made.

When this indicated information is arrived at the data processing unit, the data processing unit extracts the names of the persons who want to attend from the sent information, and searches the schedule of each person in the memory 202 of the data processing unit on the basis of the key word of the name and day's schedules. Then, the free time of each person is found from the schedule.

First, if the period of the meeting does not overlap on the schedule of each person, the time zone of no overlap is determined as the day and time on which the meeting can be held. If the period of the meeting overlaps the schedule of each person, the grade of importance requested by each terminal is compared with that of the schedule of the person. If the grade of importance from the terminal is higher, that time zone is treated as free time. If the result is the same grade of importance, a previous engagement is preferentially treated. In this way, a time zone which meets the requirements of all persons is found and a schedule is fixed. The data processing unit transmits information including the re-

sult of the fixed schedule to the calling terminal. The terminal receives the schedule of each person and displays it. Fig. 8 shows an example of this indication. When all persons have free time, the free time zones are blinked for easy finding. When there is no free time, the message of no free time or the like is displayed to blink (Fig. 8 shows the case of having free time). The column of present or absent in Fig. 8 will be mentioned later together with the expected-attendants search operation in Fig. 8.

For searching this time zone, a method can be considered in which on the terminal side a desired time zone, for example, a.m./p.m. or a fixed time and the time at which the meeting will be held are inputted and on the data processing unit side the free time in each person's schedule and the desired time zone which meets the demand of each terminal are extracted. If the time zones of all persons to attend the meeting do not coincide, the day of the meeting is changed in the draft mode or a schedule is fixed, and sent in the schedule notice operation which will be described later.

When the draft is prepared, and the day and time zone of the meeting are fixed as described above, a notice of a fixed schedule of the meeting is selected in the auxiliary menu and sent to each terminal.

The notice of schedule includes the period of the meeting in addition to the forms shown in Fig. 6. Also, the period of the meeting is displayed as the forms shown in Fig. 7, and after confirmation of information it is sent to the data processing unit. This input operation is the same as in the draft preparation except that the period of the meeting to be held is added. The data processing unit makes a key word of the name of each person who wants to attend, searches the channel number and notifies each terminal of holding the meeting. This notice is stored as a schedule of each person.

The way to read a schedule by use of a terminal will be mentioned.

When a notice of schedule is sent as described above, the terminal which has received the notice causes the small-sized speaker to sound, informing that the notice is received, and permits the display to indicate the schedule. Thus, the terminal can excite the operator's attention to the occurrence of the communication operation and inform the operator of what kind of operation has been made. The operator of the terminal depresses the schedule key in response to the sound and display. On the other hand, the operator of the terminal sometimes depresses the schedule key for knowing his own schedule. In either case, thereafter the schedule display is selected from the auxiliary menu. When as in the former case a schedule is received and the schedule display is selected, the occurrence of receiving a schedule is indicated by a flag within the terminal (for example, schedule memory 116). When the flag is raised, the received schedule is immediately displayed, and the flag is fallen. The flag is used for checking if the schedule display has been selected after receiving the schedule

or at an arbitrary time. Fig. 9 shows an example of the display of a schedule. When as in the latter case the schedule display is selected at an arbitrary time, a question of what day's schedule is to be displayed is indicated as shown in Fig. 10. Thus, when the question is answered by inputting the date and depressing the execution key, the terminal transmits the information of date to the data processing unit, and the data processing unit sends the schedule of that day back to the terminal.

The way to store the schedules in the data processing unit will be described below. When the time zones of schedules overlap as described in the draft preparation, the most preferential schedule is determined and stored in accordance with the grade of importance, and the schedules of low grade of importance are all stored. Under this condition, in order to send the schedules to the terminal, the most preferential schedule is indicated by a raised flag so that it can be easily found by the terminal. An example of the display at this time is shown in Fig. 11. All the schedules on certain dates are displayed and the most preferential schedule indicated by the flag is displayed as inverted black and white or by blinking on the display screen. If, for example, the most preferential schedules which the data processing unit treats as are indicated by 11a, 11d, 11e, the rows of the scheduled 11a, 11d, 11e are displayed in inverted black and white and the rows of the schedules 11b, 11c are displayed as usual. When the information such as place and attendants which are not displayed are desired to know, the cursor key is operated to move the schedule name frame and the execution key is depressed, thus bringing the indication shown in Fig. 9.

Why all the schedules are stored and displayed as shown in Fig. 11 is that the operator of each terminal can select a schedule in accordance with the degree of importance which the operator himself decides, not with the three ranks of the degree of importance. The operator watches this display, decides if he attends the meeting, inputs, for example, Y for presence, or N for absence in the presence or absence column of the display, and depresses the execution key. Thus, the terminal sends information of the date and time of the meeting, the names of the schedule, the names of the person who sends the information, and the presence or absence to the data processing unit. The data processing unit searches the schedules on the basis of the key words selected from the date, time of the meeting, name of schedule and the person who sent, and writes the answer to each person into the schedule stored portion of each person.

When the situation of the presence and absence in the meeting is desired by the person who sent the schedule, the persons-present search is selected from the auxiliary menu. When this is selected, the kind of the schedule which the person sent is first displayed as, for example, shown in Fig. 12. Then, the cursor key is operated to move the indication frame to the schedule name and the execution key is depressed. Thus, the

schedule name and the date and time of the meeting are transmitted to the data processing unit. The data processing unit searches the scheduled on the basis of the three pieces of information, and extracts the persons who want to attend. In addition, the key words of each person who wants to attend and the three pieces of information are used to extract the information of presence or absence of each person in the meeting from the schedule memory of each person. This information is fed back to the terminal where it is displayed. The presence and absence are indicated by O and X in the presence/absence column shown in Fig. 8.

The schedule communication mentioned above will reduce the labor and time which are taken for setting the date and time of a meeting.

In addition to this schedule communication, there are other communication modes such as telephone and mail. The auxiliary menu for telephone includes dial setting, abbreviated dialing and auto dialing. The dial setting is selected, the channel numbers are registered in the terminal, and abbreviated dialing and auto dialing are selected to make operations as in the conventional additional functions of telephone.

The auxiliary menu for the mail can include mail preparation, mail transmission, and mail reading, by which the mail transmission and reception can be made by the conventional method.

A second embodiment of a radio communication system of this invention will be described in detail with reference to the drawings.

Fig. 13 is a schematic diagram of the second embodiment of a radio communication system of the invention. A private branch exchange (PBX) 11 is connected through private telephone lines 21 to 23 to base stations 31 to 33. The subscribers have portable telephones 41 to 43. The portable telephones 41 to 43 are connected by radio waves to any ones of the base stations 31 to 33 upon talking. In Fig. 13, the portable telephone 41 is connected to the base station 31 by a radio wave, but always not connected thereto. The portable telephone can be connected to the most suitable base station at each time of talking. The private branch exchange 11 connects the channels among the base stations and also connects the extension telephones to the public telephone network 51 to 54. A mass storage 13 stores charging information, positional information of the portable telephones and so on. A controller 12 refers to the mass storage 13, and controls the private branch exchange 11 to connect the channels within the branch exchange.

Since in this embodiment the portable telephones are moved together with the owner or user, the private branch exchange 11 must always follow the locations of the portable telephones. In this embodiment, the base stations 31 to 33 periodically transmit location information signals including the identification code ID of each base station. The format of the transmitted signal is shown in Fig. 14. The location information signal, 500 is

formed of a preamble for synchronization 510, a base station identification 520, command information (command for indicating location information) 530, an incoming restriction flag 540, and an outgoing restriction flag 550. The flags 540 and 550 indicate an outgoing restriction level and an incoming restriction level, respectively. The portable telephone can detect its own location around a known base station, from this signal, and thus upon talking it is found which base station the portable telephone can be connected to. Each portable telephone sends the base station ID included in this information and its own ID to the private branch exchange 11 each time it changes in its position. The transmitted information is supplied through the control circuit 12 to the mass storage 13 where it is stored. Thus, the private branch exchange 11 is able to detect the locations of the subscribers (portable telephones), and thus upon calling to a subscriber, a correct base station can be selected.

Fig. 15 is a block diagram of the portable telephone in the radio communication system of this invention.

The portable telephone 41 comprises a radio circuit section, a microprocessor section and a peripheral circuit section thereof. The radio circuit section includes the antenna 104, the receiving circuit 102, the transmitting circuit 101, the synthesizer 105 as an oscillator for determining the frequency, the voice circuit 125, the loud speaker 126, the microphone 127, the modem 106 for modulating and demodulating a digital signal such as a communication control signal and a electric mail, and the voice message recording circuit 128 for storing the voice message transmitted or the voice message being transmitted. The radio circuit section is controlled by a microprocessor (CPU) 921 through a radio control I/O 920. The microprocessor section includes a ROM 922 having a program stored therein, a RAM 923 serving as a memory which data can be written in and read from, an interrupting timer 924 for the occurrence of an interruption at each constant time relative to the microprocessor (CPU) 921, a clock 925 for indicating the present day and time, a key scanning circuit 118 for reading in the information associated with a key 117, the display driver 120 for driving a display 929, and a bell driver 930 for ringing a bell 931.

The radio portable telephone 41 has a plurality of communication modes such as talking by voice, storage of voice message, electric mail with ringing and electric mail with nonringing, and makes automatic switching of these communication modes on the basis of the information specified in a schedule and the present positional information. The portable telephone has the function (address book manager) for controlling the private information such as address book other than the schedule control function. In this specification, hereinafter, the scheduler manager, address book manager and communication manager are called together as a secretarial service function.

The CPU 921 makes radio control and control of

secretarial function, and the program for these control operations is stored in the ROM 922. Fig. 16 shows the contents of the stored program in the ROM 922. The program includes a basic input/output system BIOS, 1300 for radio communication, serving as a subroutine group for controlling the radio system, a basic input/output system BIOS, 1301 serving as a subroutine group for keying, display, timer, clock and bell, an operation program 1302 for radio communication, and an operation program 1303 for secretarial service, as the program of application level. The operation program 1302 for radio communication includes a program 1304 for outgoing control, a program 1305 for incoming control, and a program 1306 for location control. The operation program 1303 for secretarial service includes a schedule input/output program 1307, an electric mail program 1308, an address book input/output program 1309, and a scheduler program 1310.

Fig. 17 shows a memory map of the RAM 923. The memory map 923 comprises a memory area 1501 for storing electric mail to be transmitted or received, a memory area 1502 for schedule a memory area 1503 for address book, a memory area 1504 for present location, a memory area 1505 for communication control flag, a base station identification-location table 1506 for storing the relation between the base station ID signal and the location of conference room or the like, and a work area 1507 for use in stack area or the like.

Although the terminal 1 in the first embodiment includes the radio controller 107 for radio channel control and the communication mode control circuit 110 in addition to the microprocessor 111 having the secretarial service function, in this second embodiment the CPU 921 executes the programs 1304 to 1310 stored in the ROM 922, thereby making the same processing. While the microprocessor 111 in the first embodiment permits the data received through the antenna 104 and the data inputted through the keyboard to be stored in the memories 114 to 116, 113 associated with the kinds of the data, in this second embodiment these data are stored in the areas 1501 to 1507 on the RAM 923. The provision of a processor for exclusive use for each processing function and the provision of a memory device for exclusive use for each piece of data can be arbitrarily combined in accordance with the speed of communication channel, amount of data to be treated, and necessity for miniaturization of portable terminals.

The restriction for communication modes includes two cases: the restriction based on the signal from the base station (communication restriction by location) and the restriction inputted when the user sets a schedule (communication restriction by the schedule).

The communication mode which the portable telephone eventually selects is either one of the receiving mode determined on the basis of the communication restriction by the location and the receiving mode determined on the basis of the communication restriction by the schedule. The details will be described later with ref-

erence to Fig. 22. The communication restriction depending on the location is determined by the contents of the incoming restriction flag and the outgoing restriction flag included in the location information signal 500 (Fig. 14). The monitoring of the communication restriction depending on the location and the recognition of the present location are performed by the location control program 1306 (Fig. 16). This program 1306 is started to execute when the location information signal from the base station is received by the modem 915. Fig. 18 is a flowchart of the location control program 1306. The base station ID is detected from the received location information signal (step 601), and compared with the previous base station ID registered in the present location memory area (step 602). If it is different therefrom, the base station ID included in the received location information signal is written in the present location memory area 1504 (step 603) and the base station ID is sent to the private branch exchange (step 604). The private branch exchange stores the base station ID as the ID of the base station which that portable telephone can now utilize. Thus, the present location of the portable telephone is registered in both the portable telephone itself and the private branch exchange. After this processing, the communication control flags 540, 550 included in the location information signal are written in the location restriction flag memory area 1509 of the communication restriction flag memory area 1505 (step 605).

On the other hand, the restriction depending on the schedule is performed by setting the contents of the communication restriction when the user inputs the schedule. Fig. 19 shows an example of the inputting of the schedule and the setting of the restriction level. In this example, in the first conference room, the incoming call is limited to the nonringing communication, and the outgoing call to the nonvoice frequency communication, during the time, 10:00-12:00.

The communication mode regarding the restriction, as shown in Fig. 20, depends on the communication restriction level such as communication with ringing, nonringing communication, and voice frequency communication, nonvoice frequency communication. For example, the electric mail with ringing is the mode in which a ringer rings the instant that a mail is received. The electronic mail indicates the digital character communication mode such as address book communication, schedule communication, or communication of base station ID-location list.

Fig. 21 shows the format of the communication restriction flag memory area 1505 within the RAM 923. The communication restriction flag, or the incoming restriction flag, the outgoing restriction flag is, as shown in Fig. 21, formed of three flags: the incoming (outgoing) prohibition flag, the ringing prohibition flag and voice communication prohibition flag. The incoming (outgoing) prohibition flag 91 indicates to inhibit all incoming (outgoing) signals, the ringing prohibition flag 92 indicates to inhibit the communication accompanied with

ringing, such as the talking communication and the electric mail with ringing, and the voice communication prohibition flag 93 indicates to inhibit communication by voice such as the talking communication and the voice message.

The relation between the "communication restriction depending on the location" and the "communication restriction depending on the schedule" is shown in Fig. 22. When there are two cases of communication restriction, the communication restriction depending on the schedule has priority over that depending on the location. However, when it is difficult to go to the place at a predetermined time for some reason despite the communication restriction set in a schedule for a meeting, it is desired that the communication restriction be ineffective. Therefore, when the related person is not present at a specified place at a time set in the schedule, the "communication restriction depending on the location" at that location has priority over that depending on the schedule.

The operation flow at the time of incoming call will be described with reference to Fig. 23.

The portable telephone 41, when receiving a signal for requesting the incoming call from the radio base station, starts the incoming control program 1305.

At step 700, it is determined by the location specified by the schedule and the present location information that the communication restriction flag (here, incoming restriction flag) for use in determining a communication mode is read from the location communication restriction flag or from the schedule communication restriction flag. The further details thereof will be mentioned later with reference to Fig. 24.

When the communication mode determined at step 700 is the mode in which all incoming calls are inhibited (incoming call prohibition mode), the calling party is notified of the incoming call prohibition mode (step 711). When the communication mode is the others (communication mode and so on), the program advances to the next step (step 710).

Then, the communication mode is sent to the calling side (step 712), and a response signal from the calling side is waited. After the response signal is received, the program progresses to the next step (step 712).

When the request communication mode included in the response signal from the calling side is an emergency communication mode (which will be described later with reference to Fig. 25), the program is advanced (step 714) for making some communication (steps 717, 719, 721, 723) without no comparison between the communication mode of the portable telephone and the request communication mode included in the response signal from the calling party.

At step 715, the above-mentioned communication modes are compared. If there is no coincidence, the fact of no arrival of the call is transmitted to the calling side (step 724), and the processing ends.

If the communication modes are coincident, the re-

lated communication mode is identified at steps 716, 718, 720, 722, and each communication is made (step 717, 719, 721, 723). Then, the processing ends (step 725).

Fig. 24 is a detailed flowchart of step 700 of the program 1305.

At step 701, it is checked if the communication restriction is set in the schedule at the present time.

If the communication restriction is found to be set at step 701, the location set in the schedule and the present location are compared (step 702). If the result of the comparison is that the locations are agree, the communication restriction set in the schedule is employed as the incoming call restriction (step 706). If there is no agreement, the program progresses to the next step 703. If at step 707 it is found that no communication restriction is set, it is checked if the communication restriction is set in the signal 220 (Fig. 14) from the base station (step 703).

If it is found that there is the so-called "communication restriction depending on the location" from the result at step 703, the communication restriction depending on the location is employed as the incoming call restriction (step 705). If there is no "communication restriction depending on the location", it is decided that there is no communication restriction (step 704).

Fig. 25 is a diagram useful for explaining the communication between the calling party and the called party at steps 712 to 713 (Fig. 23). The communication mode on the calling side is transmitted to the called side. If the communication mode which the calling party first requested is possible, the communication start signal is automatically transmitted from the calling party. If there is no possible communication mode, the request for the change to the communication mode in which the call can be received is indicated on the display of the calling side. If the calling party selects the restricted communication mode, the called side forces the communication to end. However, if the communication is emergent, the calling party pushes the restriction release key of the key 117, adding a signal indicative of emergent call to the communication start signal so that the call can be received without use of the incoming call restriction. However, this key is permitted to only once push after receiving the communication mode request signal in Fig. 25, for avoiding the abuse of the key.

According to this invention, the present location information and the schedule information are used, and when a person is not at the corresponding location at a time set in the schedule, an alarm is issued against the owner, or operator of the telephone. The alarm is issued by controlling the bell 931 by the bell driver 930 so that the alarm tone is different from the normal ringing tone. If at the time of input in the schedule the location calling is made on as shown in Fig. 19, no absence in the first conference room at 10:00 will result in ringing and indication of this fact on the display. If the related person is present in the conference room, no alarm is issued.

Thus, it is possible to avoid the attendance at a meeting from being forgotten and the useless ringing in the meeting. This function is executed by the schedule check program 1310 as shown in Fig. 26.

At step 800, the present time is read from the clock 925 and stored in the memory 923.

The present time is compared with the time set in the schedule (for example, the time at which the meeting is started in Fig. 19) (step 801). If the comparison reaches no coincidence, the processing ends. If there is coincidence, the program goes to the next step 802.

At step 802, it is decided if an alarm is set in the corresponding schedule. This alarm may be set by operating a separately provided switch on the portable telephone. As described with reference to Fig. 19, when a schedule is set, another "location calling" column may be provided to set the schedule.

When an alarm is set, the program advances to step 803, and when an alarm is not set, the program goes to step 807.

At step 803, it is decided if "ON" is set in the "location calling" column of the corresponding schedule, or if a check alarm on location is set.

When the check alarm on location is not set, an alarm is issued for a predetermined period of time, and this fact is indicated on the display (step 806).

When the check alarm on location is set, the present location is read (step 804), and the read present location is compared with the location set in the schedule (step 805). If the comparison reaches no agreement, the program goes to step 806. If the locations are coincident, no alarm is issued and the program advances to step 807.

At step 807, the incoming call receiving restriction flag is set in the schedule, or a communication mode is set, and the processing ends (return). This schedule check program is periodically executed by the interrupt caused by the interrupting timer 924.

The party concerned with the meeting sends a notice of opening the meeting to the persons who are to participate in the meeting, by means of electric mail or schedule communication. When the schedule communication is used for the notice, it is possible to set so that ringing is made if the related person is absent in the meeting as described above. When necessary matters are registered in the schedule at the telephone terminal of the meeting opening party, the electric mail having a ringing mode is automatically sent to each person when all persons are not in the conference room at the meeting time. Alternatively, the speech stored in the automatic calling voice message circuit is sent in the normal voice channel mode. This enables the percentage of attendance increase.

According to the radio communication system of this invention, it is possible to realize the terminal capable of automatically switching the receiving modes.

To be concrete, since the portable terminal has a plurality of communication modes and is capable of au-

tomatically switching the modes if necessary, it is possible to reduce the number of calls of low importance during a meeting, and necessary contents can be transmitted by nonringing communication such as electric mail and the voice messages. Since the communication modes can be automatically switched by the schedule and the present location, it is not necessary to switch the complicated modes which change according to the situations, convenience is increased, and it is possible to avoid the mode switching operation from being forgotten. Moreover, since it is noticed that at a fixed time the related person is not at the place indicated in the schedule, it is possible to prevent the attendance at a meeting from being forgotten. Furthermore, since the base station ID-location table necessary for location information is automatically sent from the private branch exchange, it is not necessary to manually input at each change.

## Claims

1. A radio communication system for making voice communication or data communication between two portable radio telephones (1) within a service area formed of a plurality of divided radio zones, comprising:

relay means (3, 4) for making connection control of communication channels, and which includes a plurality of base stations (3) respectively placed in said radio zones and an exchange station (4) connected to each of said base stations (3), each of said base stations (3) having radio communication means for interchanging signals with portable radio telephones (1) in the radio zone under control of the corresponding base station, said exchange station (4) setting a free communication channel on which a communication signal received from the portable radio telephone (1) within its own radio zone is transmitted to said exchange station (4) and on which a communication signal received from said exchange station (4) is transmitted to the portable radio telephone (1) within said radio zone;

wherein each of said portable radio telephones (1) includes a radio communication circuit (101, 102, 103, 104, 105) for radio transmitting and receiving voice or data signals between the corresponding portable radio telephone (1) and said base station (3) which is assigned to the radio zone in which said corresponding radio telephone (1) is located, a receiver (126) for producing the voice signal from said radio communication circuit, a transmitter (127) for supplying the voice signal from a user to said radio communication circuit, data input means (117,

118) for specifying a voice communication mode for transmitting and receiving the voice signal to or from said base station (3) or a data communication mode for transmission or reception of the data signal, and inputting data in said data communication mode by the user, data output means (119, 120, 129, 160) for producing data in said data communication to the user, an inner memory for storing a program, and a terminal processor (111) which executes said program so that data inputted by said data input means is supplied in a format to said radio communication circuit and data from said radio communication circuit is supplied in a certain format to said data output means;

characterised in that :

said radio communication means is responsive to a calling request from each of said portable radio telephones (1) to transmit to said exchange station (4) the address of the portable radio telephone of the opponent included in said calling request, while said exchange station (4) transmits an incoming call request to the portable radio telephone (1) having the address of the opponent, and thereby sets said free communication channel;

said exchange station (4) has a table memory (411) for storing information concerning the relation between the channel to each base station (3) and the address of each portable radio telephone (1), thereby making connection of channels between the base stations (3) in accordance with the request from an arbitrary one of said base stations (3); and a

a central data processing unit (2) is provided for processing data received from said exchange station (4), said central data processing unit (2) being connected to said exchange station (4) and having a central memory (202) for storing data received from said exchange station (4) and a central processor (201) for processing said data, said central data processing unit (2) being connected to said base stations (3) when said exchange station (4) receives data from an arbitrary one of said base stations (3).

2. A radio communication system according to claim 1, wherein said portable radio telephone (1) includes a first memory (114-116) for adding a flag to data inputted by said data input means and storing said flag-added data as first data, and a second memory (113) for temporarily storing data to be transmitted to said base station (3) as second data, said terminal processor includes means for reading, during a predetermined period, said first data pro-

- vided with said flag from said first memory, storing it as said second data in said second memory, and eliminating the flag from said first data within said first memory after transmitting said second data to said base station.
3. A radio communication system according to claim 2, wherein said central data processing unit (2) includes means for controlling said central memory to store said second data received through said relay means (3, 4) from said portable radio telephone, said central processor includes means for copying said second data and sending said copied data through said relay means back to said portable radio telephone, said terminal processor of said portable radio telephone includes means for comparing said copied data and the second data of said second memory and transmitting the result to said central data processing unit, and said central data processing unit includes means for eliminating said second data from said central memory if the result of the comparison reaches disagreement.
  4. A radio communication system according to claim 3, wherein said portable radio telephone (1) includes means for eliminating said second data or again transmitting said second data to said data processing unit (2) when said result of the comparison reaches disagreement.
  5. A radio communication system according to claim 1, wherein said central processor of said central data processing unit (2) includes means for processing the data stored in said central memory (202) in accordance with a request signal received through said relay means (4, 3) from said portable radio telephone (1) in said data communication mode, and for transmitting the result of said processing to the portable radio telephone specified by said request signal.
  6. A radio communication system according to claim 1, wherein said terminal processor (111) of said portable radio telephone (1) includes means for transmitting data including a pass word inputted by said data input means, to said base station, and said central processor (201) of said central data processing unit (2) includes means for eliminating said data from said central memory when the data received through said relay means from an arbitrary one of said portable radio telephones does not include said pass word.
  7. A radio communication system according to claim 1, wherein said portable radio telephone (1) has a memory for storing data inputted by said data input means (117, 118), said terminal processor (111) includes means for transmitting information including said data and the address on said memory through said relay means to said central data processing unit (2), and said central processor (201) of said central data processing unit (2) includes means for controlling said central memory to store the data included in said information as first data in association with said address, reading, during each predetermined period, the data specified by said address as second data through said relay means (4, 3) from said portable radio telephone (1), comparing said first data and said second data, and updating said first data on said central memory into said second data in accordance with the result of the comparison.
  8. A radio communication system according to claim 1, wherein said portable radio telephone (1) has a clock (112) for producing the present time, and a memory for storing the data inputted from said data input means, and said terminal processor (111) includes means for transmitting information including said data, the address at which said data is stored in the memory, and a time at which said data is produced, through said relay means to said central data processing unit (2), said central processor (201) of said central data processing unit (2) includes means for controlling said central memory (202) to store the data included in said information as first data in association with said address and said data production time, reading, during each predetermined period, the data specified by said address from said memory of said portable radio telephone (1) through said relay means as second data, comparing the production time of said first data with that of said second data, and permitting said central memory to store data of newer production time.
  9. Use of a portable radio telephone in a radio communication system according to any of claims 1 to 8, said portable radio telephone comprising: a radio communication circuit (104, 103, 101, 102, 105) for radio transmitting and receiving voice or data signals between the corresponding portable radio telephone (1) and a base station (3) which is assigned to the radio zone in which said corresponding radio telephone is located; a receiver (126) for producing a voice signal from said radio communication circuit; a transmitter (127) for supplying the voice signal from a user to said radio communication circuit; data input means (117, 118) for specifying a voice communication mode for transmitting and receiving the voice signal to or from said base station or a data communication mode for transmission or reception of a data signal, and inputting data in said data communication



mode by the user;  
 data output means (119, 120) for producing data in said data communication to the user;  
 an inner memory for storing a program; and  
 a terminal processor (111) which executes said program so that data inputted by said data input means is supplied in a format to said radio communication circuit and data from said radio communication circuit is supplied in a certain format to said data output means.

10. Use of a portable radio telephone according to claim 9, wherein said portable radio telephone has a memory for adding a code indicative of permitting or inhibiting the transmitting of data to said data processing unit, to data inputted by said data input/output means and storing the code-added data, and said terminal processor (111) includes means for automatically transmitting only the data with its added code indicating the permission of transmitting said data, to said base station with a predetermined period.

11. Use of a portable radio telephone according to claim 9 having timer means (112) for generating the present time and a date, a schedule memory (116) for storing schedule information inputted from said data input means (117, 118), and ringing means for generating a ringing tone by which the user is notified of having received an incoming call signal from said base station, wherein said terminal processor (111) includes means for controlling said ringing means in accordance with said schedule information, and the present time and date generated from said timer means when said terminal processor (111) receives in said voice communication mode the incoming call signal from said base station (3) which is assigned to the radio zone in which said portable radio telephone (1) is located.

12. Use of a portable radio telephone according to claim 11 having a memory for storing the relation between the address of each base station and location information, said terminal processor (111) including means for controlling said ringing means in accordance with said location information on said memory, said schedule information, and the present time and date generated from said timer means (112) which are related with the address of said base station (3) included in said incoming call signal from said base station.

13. Use of a portable radio telephone according to claim 11 having a memory for storing the relation between the address of each base station and location information and means for setting said schedule information in association with at least time data and location data, said terminal processor (111) including

means for controlling said ringing means to generate an alarm tone different from said ringing tone when the location information on said memory which associates with the address of said base station included in a control signal transmitted from the base station during each predetermined period is different from the location data included in said schedule information.

14. Use of a portable radio telephone according to claim 11, wherein said terminal processor (111) includes means for actuating said ringing means irrespective of said schedule information and the present time and date generated from said timer means (112), when having received a predetermined incoming call request signal from said base station (3).

15. A radio communication system for making voice communication or data communication between two portable radio telephones (1) within a service area formed of a plurality of divided radio zones, comprising:

a plurality of base stations (3) respectively placed in said radio zones; and  
 an exchange station (4) connected to each of said base stations;  
 each of said base stations (3) having radio communication means (6, 302, 301, 303, 305) for interchanging signals with portable radio telephones (1) in the radio zone under control of the corresponding base station, said exchange station setting a free communication channel on which a communication signal received from the portable radio telephone (1) within its own radio zone is transmitted to said exchange station (4) and on which a communication signal received from said exchange station is transmitted to the portable radio telephone within said radio zone;

wherein each of said portable radio telephones (1) includes a radio communication circuit (101-105) for radio transmitting and receiving voice or data signals between the corresponding portable radio telephone (1) and said base station (3) which is assigned to the radio zone in which said corresponding radio telephone is located, a receiver (126) for producing the voice signal from said radio communication circuit, a transmitter (127) for supplying the voice signal from a user to said radio communication circuit, data input means for inputting data (117, 118), and ringing means for generating a ringing tone for notifying the user of having received an incoming call signal from said base station,

characterised in that :

said radio communication means is responsive to a calling request from each of said portable radio telephones to transmit to said exchange station (4) the address of the portable radio telephone of the opponent included in said calling request, while said exchange station transmits an incoming call request to the portable radio telephone having the address of the opponent, and thereby sets said free communication channel;

said exchange station has a table memory (411) for storing information concerning the relation between the channel to each base station (3) and the address of each portable radio telephone, thereby making connection of channels between the base stations in accordance with the request from an arbitrary one of said base station; and

each of said portable radio telephones includes a schedule memory (116) for storing schedule information inputted from said data input means, timer means (112) for generating the present time and date, and a terminal processor (111) for actuating said ringing means in accordance with said schedule information and the present time and date generated from said timer means when having received an incoming call signal from the base station which is assigned to the radio zone including said portable radio telephone.

16. Use of a portable radio telephone in a radio communication system according to claim 15, said portable radio telephone comprising:

a radio communication circuit (101-105) for transmitting and receiving a voice signal on a radio wave from and to a base station (3) which is assigned to a radio zone in which said portable radio telephone is located;

a receiver (126) for emanating sound of the voice signal derived from said radio communication circuit;

a transmitter (127) for converting voice from the user into the voice signal which is transmitted to said radio communication circuit;

data input means for inputting data (117, 118); a schedule memory (116) for storing schedule information inputted through said data input means;

timer means (112) for generating the present time and date;

ringing means for generating a ringing tone by which the user is notified of having received an incoming call signal from the base station; and a terminal processor (111) for actuating said ringing means in accordance with said schedule information and the present time and date

generated from said timer means when having received the incoming call signal from the base station which is assigned to the radio zone in which said portable radio telephone is located.

17. Use of a portable radio telephone according to claim 16 wherein said portable radio telephone (1) has a memory for recording the relation between the address of each base station and location information, and said terminal processor (111) includes means for controlling said ringing means in accordance with the location information on said memory which information is associated with the address of said base station included in the incoming call signal from said base station, said schedule information, and the present time and date generated from said timer means.

18. Use of a portable radio telephone according to claim 16, wherein said portable radio telephone has a memory for recording the relation between the address of each base station and location information, and sets said schedule information so that at least the time data and the location data are associated with each other, and said terminal processor (111) includes means for controlling said ringing means to generate alarm sound different from said ringing tone when the location information of said memory which is associated with the address of said base station (3) included in the control signal transmitted from the base station during each certain period is different from the location data included in said schedule information.

19. Use of a portable radio telephone according to claim 16, wherein said terminal processor (111) includes means for actuating said ringing means irrespective of said schedule information and the present time and date generated from said timer means (112) when having received a predetermined incoming call request signal from said base station (3).

#### Patentansprüche

1. Funkkommunikationssystem zur Sprach- oder Datenkommunikation zwischen zwei tragbaren Funktelefonen (1) innerhalb eines von einer Vielzahl unterteilter Funkzonen gebildeten Dienstleistungsbezirks, aufweisend:

eine Relaiseinrichtung (3, 4) zur Verbindungssteuerung von Kommunikationskanälen, mit mehreren Basisstationen (3), die jeweils in den Funkzonen angeordnet sind, und mit einer Vermittlungsstation (4), die mit jeder der Basisstationen (3) verbunden ist, wobei die Basisstationen (3) jeweils eine Funkkommunikationsein-

richtung zum Austausch von Signalen mit tragbaren Funktelefonen (1) innerhalb der unter Kontrolle der entsprechenden Basisstation befindlichen Funkzone aufweisen, wobei die Vermittlungsstation (4) einen freien Kommunikationskanal festlegt, auf dem ein von dem tragbaren Funktelefon (1) her innerhalb seiner eigenen Funkzone empfangenes Kommunikationssignal an die Vermittlungsstation (4) gesendet und ein von der Vermittlungsstation (4) her empfangenes Kommunikationssignal an das tragbare Funktelefon (1) innerhalb der Funkzone gesendet wird;

wobei jedes der tragbaren Funktelefone (1) eine Funkkommunikationsschaltung (101, 102, 103, 104, 105) zum Funk-Aussenden und -Empfangen von Sprach- oder Datensignalen zwischen dem entsprechenden tragbaren Funktelefon (1) und der Basisstation (3), die der Funkzone, in der sich das entsprechende Funktelefon (1) befindet, zugeordnet ist, einen Empfänger (126) zur Erzeugung der Sprachsignale von der Funkkommunikationsschaltung, einen Übermittler (127) zur Lieferung der Sprachsignale von einem Benutzer an die Funkkommunikationsschaltung, eine Dateneingabeeinrichtung (117, 118) zur Festlegung eines Sprachkommunikationsmodus zur Übermittlung und zum Empfang des Sprachsignals an die oder von der Basisstation (3) oder eines Datenkommunikationsmodus zur Übermittlung oder zum Empfang des Datensignals und zur Eingabe von Daten in dem Datenkommunikationsmodus durch den Benutzer, eine Datenausgabeeinrichtung (119, 120, 129, 160) zur Lieferung von Daten an den Benutzer bei der genannten Datenkommunikation, einen internen Speicher zur Speicherung eines Programms und einen Terminalprozessor (111), der das Programm ausführt, so daß von der Dateneingabeeinrichtung eingegebene Daten in einem Format an die Funkkommunikationsschaltung und Daten von der Funkkommunikationsschaltung in einem gewissen Format an die Datenausgabeeinrichtung geliefert werden, aufweist; dadurch **gekennzeichnet**, daß

die Funkkommunikationseinrichtung auf eine Rufanforderung von jeder der tragbaren Funktelefone (1) anspricht, um der Vermittlungsstation (4) die in der Rufanforderung enthaltene Adresse des tragbaren Funktelefons der Gegenstelle zu übermitteln, während die Vermittlungsstation (4) eine eingehende Rufanforderung an das tragbare Funktelefon (1) mit der Adresse der Gegenstelle übermittelt und dadurch den genannten freien Kommunikationskanal festlegt;

die Vermittlungsstation (4) einen Tabellenspei-

cher (411) zur Speicherung von Information über die Beziehung zwischen dem Kanal zu jeder Basisstation (3) und der Adresse jedes tragbaren Funktelefons (1) aufweist und dadurch Kanalverbindungen zwischen den Basisstationen entsprechend der Anforderung einer beliebigen der Basisstationen (3) aufstellt; und zur Verarbeitung von von der Vermittlungsstation (4) her empfangenen Daten eine zentrale Datenverarbeitungseinheit (2) vorgesehen ist, die mit der Vermittlungsstation (4) her verbunden ist und einen Zentralspeicher (202) zur Speicherung von von der Vermittlungsstation (4) her empfangenen Daten und einen Zentralprozessor (201) zur Verarbeitung der Daten aufweist und mit den Basisstationen (3) verbunden wird, wenn die Vermittlungsstation (4) Daten von einer beliebigen der Basisstationen (3) empfängt.

2. Funkkommunikationssystem nach Anspruch 1, wobei das tragbare Funktelefon (1) einen ersten Speicher (114-116) zum Hinzufügen einer Kennmarke an die von der Dateneingabeeinrichtung eingegebenen Daten und zum Speichern der um die Kennmarke erweiterten Daten als erste Daten und einen zweiten Speicher (113) zum vorübergehenden Speichern von zu der Basisstation (3) zu übermittelnden Daten als zweite Daten aufweist, wobei der Terminalprozessor eine Einrichtung, um während einer vorbestimmten Zeitspanne die mit der Kennmarke versehenen ersten Daten aus dem ersten Speicher zu lesen, sie als zweite Daten in dem zweiten Speicher zu speichern und die Kennmarke von den ersten Daten in dem ersten Speicher zu entfernen, nachdem die zweiten Daten der Basisstation übermittelt wurden.
3. Funkkommunikationssystem nach Anspruch 2, wobei die zentrale Datenverarbeitungseinheit (2) eine Einrichtung aufweist, um den Zentralspeicher zur Speicherung der über die Relaiseinrichtung (3, 4) von dem tragbaren Funktelefon her empfangenen zweiten Daten zu steuern, der Zentralprozessor eine Einrichtung aufweist, um die zweiten Daten zu kopieren und die kopierten Daten über die Relaiseinrichtung an das tragbare Funktelefon zurückzusenden, der Terminalprozessor des tragbaren Funktelefons eine Einrichtung zum Vergleich der kopierten Daten und der zweiten Daten des zweiten Speichers und zum Übermitteln des Ergebnisses an die zentrale Datenverarbeitungseinheit aufweist und wobei die zentrale Datenverarbeitungseinheit eine Einrichtung umfaßt, um die zweiten Daten aus dem Zentralspeicher zu löschen, wenn das Vergleichsergebnis keine Übereinstimmung angibt.
4. Funkkommunikationssystem nach Anspruch 3, wo-

- bei das tragbare Funktelefon (1) eine Einrichtung aufweist, um die zweiten Daten zu löschen oder sie erneut an die Datenverarbeitungseinheit (2) zu senden, wenn das Vergleichsergebnis keine Übereinstimmung angibt.
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5. Funkkommunikationssystem nach Anspruch 1, wobei der Zentralprozessor der zentralen Datenverarbeitungseinheit (2) eine Einrichtung aufweist, um die in dem Zentralspeicher (202) gespeicherten Daten entsprechend einem über die Relaiseinrichtung (4, 3) von dem tragbaren Funktelefon (1) in dem Datenkommunikationsmodus erhaltenen Anforderungssignal zu verarbeiten und das Ergebnis der Verarbeitung an das von dem Anforderungssignal angegebene tragbare Funktelefon zu senden.
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6. Funkkommunikationssystem nach Anspruch 1, wobei der Terminalprozessor (111) des tragbaren Funktelefons (1) eine Einrichtung aufweist, um Daten einschließlich eines von der Dateneingabeeinrichtung eingegebenen Kennworts an die Basisstation zu übermitteln und wobei der Zentralprozessor (201) der zentralen Datenverarbeitungseinheit (2) eine Einrichtung zum Löschen der Daten aus dem Zentralspeicher aufweist, wenn die über die Relaiseinrichtung von einem beliebigen tragbaren Funktelefon erhaltenen Daten das Kennwort nicht enthalten.
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7. Funkkommunikationssystem nach Anspruch 1, wobei das tragbare Funktelefon (1) einen Speicher zur Speicherung von von der Dateneingabeeinrichtung (117, 118) eingegebenen Daten aufweist, der Terminalprozessor (111) eine Einrichtung zum Übermitteln von Informationen einschließlich der Daten und der Adresse des Speichers über die Relaiseinrichtung an die zentrale Datenverarbeitungseinheit (2) umfaßt und der Zentralprozessor (201) der zentralen Datenverarbeitungseinheit (2) eine Einrichtung beinhaltet, um den Zentralspeicher so zu steuern, daß die Daten einschließlich der genannten Informationen als erste Daten in Bezug zu der Adresse gespeichert werden, um während jeder vorbestimmten Zeitspanne die von der Adresse angegebenen Daten als zweite Daten über die Relaiseinrichtung (4, 3) aus dem tragbaren Funktelefon (1) zu lesen, um die ersten Daten und die zweiten Daten zu vergleichen und um entsprechend dem Vergleichsergebnis die ersten Daten in dem Zentralspeicher auf den Stand der zweiten Daten zu aktualisieren.
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8. Funkkommunikationssystem nach Anspruch 1, wobei das tragbare Funktelefon (1) eine Uhr (112) zur Erzeugung der gegenwärtigen Zeit und einen Speicher zur Speicherung der von der Dateneingabeeinrichtung eingegebenen Daten aufweist und der Terminalprozessor (111) eine Einrichtung umfaßt, um Informationen einschließlich der genannten Daten, der Adresse, an der die Daten in dem Speicher abgelegt sind, und einer Zeit, zu der die Daten erzeugt wurden, über die Relaiseinrichtung an die zentrale Datenverarbeitungseinheit (2) zu senden, und wobei der Zentralprozessor (201) der zentralen Datenverarbeitungseinheit (2) eine Einrichtung beinhaltet, um den Zentralspeicher (202) so zu steuern, daß die in den genannten Informationen enthaltenen Daten als erste Daten in Bezug zu der genannten Adresse und der Datenerzeugungszeit abgespeichert werden, um während jeder vorbestimmten Zeitspanne die von der genannten Adresse angegebenen Daten über die Relaiseinrichtung als zweite Daten aus dem Speicher des tragbaren Funktelefons (1) zu lesen, die Erzeugungszeit der ersten Daten mit der der zweiten Daten zu vergleichen und dem Zentralspeicher zu erlauben, jeweils Daten der jüngeren Erzeugungszeit zu speichern.
9. Verwendung eines tragbaren Funktelefons in einem Funkkommunikationssystem nach einem der Ansprüche 1 bis 8, wobei das tragbare Funktelefon folgendes umfaßt:
- eine Funkkommunikationsschaltung (104, 103, 101, 102, 105) zur Funkübermittlung und zum Funkempfang von Sprachoder Datensignalen zwischen dem entsprechenden tragbaren Funktelefon (1) und einer Basisstation (3), die der Funkzone zugeordnet ist, in der sich das entsprechende Funktelefon befindet;
- einen Empfänger (126) zur Erzeugung eines Sprachsignals von der Funkkommunikationsschaltung;
- einen Übertrager (127) zur Lieferung des Sprachsignals von einem Benutzer an die Funkkommunikationsschaltung;
- eine Dateneingabeeinrichtung (117, 118) zur Festlegung eines Sprachkommunikationsmodus zur Übermittlung und zum Empfang des Sprachsignals an die oder von der Basisstation oder eines Datenkommunikationsmodus zur Übermittlung oder zum Empfang eines Datensignals und zum Eingeben von Daten in dem genannten Datenkommunikationsmodus durch den Benutzer;
- eine Datenausgabeeinrichtung (119, 120) zur Erzeugung von Daten für den Benutzer bei der genannten Datenkommunikation;
- einen internen Speicher zur Speicherung eines Programms; und
- einen Terminalprozessor (111), der das Programm ausführt, so daß von der Dateneingabeeinrichtung eingegebene Daten in einem Format an die Funkkommunikationsschaltung geliefert werden und Daten von der Funkkom-

munikationsschaltung in einem gewissen Format der Datenausgabeeinrichtung zur Verfügung gestellt werden.

10. Verwendung eines tragbaren Funktelefons nach Anspruch 9, wobei das tragbare Funktelefon einen Speicher aufweist, um von der Eingabe-/Ausgabeeinrichtung eingegebenen Daten einen das Erlauben oder Verhindern der Datenübermittlung an die Datenverarbeitungseinheit angegebenden Code hinzuzufügen und die mit dem Code versehenen Daten zu speichern und wobei der Terminalprozessor (111) eine Einrichtung aufweist, um innerhalb einer vorbestimmten Zeitspanne der Basisstation lediglich diejenigen Daten zu übermitteln, deren hinzugefügter Code die Erlaubnis zur Datenübermittlung angibt. 5
11. Verwendung eines tragbaren Funktelefons nach Anspruch 9 mit einer Zeitgebereinrichtung (112) zur Erzeugung der gegenwärtigen Zeit und eines Datums, einem Zeitplanspeicher (116) zur Speicherung von Zeitplaninformationen, die von der Dateneingabeeinrichtung (117, 118) eingegeben werden, und mit einer Signaleinrichtung zur Erzeugung eines Signaltons mit dem der Benutzer von dem Empfang eines ankommenden Rufsignals von der Basisstation benachrichtigt wird, wobei der Terminalprozessor (111) eine Einrichtung umfaßt, um die Signaleinrichtung entsprechend der Zeitplaninformation und der von der Zeitgebereinrichtung erzeugten gegenwärtigen Zeit und des Datums anzusteuern, wenn er in dem Sprachkommunikationsmodus das eingehende Rufsignal von der Basisstation (3), die der Funkzone zugeordnet ist, in der sich das tragbare Funktelefon (1) befindet, empfängt. 20
12. Verwendung eines tragbaren Funktelefons nach Anspruch 11, mit einem Speicher zur Speicherung der Beziehung zwischen der Adresse jeder Basisstation und Ortsinformation, wobei der Terminalprozessor (111) eine Einrichtung aufweist, um die Signaleinrichtung entsprechend der Ortsinformation in dem Speicher, der Zeitplaninformation und der von der Zeitgebereinrichtung (112) erzeugten gegenwärtigen Zeit und des Datums zu steuern, die in bezug zu der in dem von der Basisstation eingehenden Rufsignal enthaltenen Adresse der Basisstation (3) stehen. 25
13. Verwendung eines tragbaren Funktelefons nach Anspruch 11, mit einem Speicher zur Speicherung der Beziehung zwischen der Adresse jeder Basisstation und Ortsinformation und mit einer Einrichtung, um die Zeitplaninformation gemäß Zeitdaten und Ortsdaten aufzustellen, wobei der Terminalprozessor (111) eine Einrichtung aufweist, um die Signaleinrichtung so zu steuern, daß ein von dem Si- 30

gnalton verschiedener Alarmton erzeugt wird, wenn sich die Ortsinformation in dem Speicher, die mit der Adresse der Basisstation verbunden ist, die in einem während jeder vorbestimmten Zeitspanne von der Basisstation ausgesandten Steuersignal enthalten ist, von den in der Zeitplaninformation enthaltenen Ortsdaten unterscheidet.

14. Verwendung eines tragbaren Funktelefons nach Anspruch 11, wobei der Terminalprozessor (111) eine Einrichtung beinhaltet, um die Signaleinrichtung unabhängig von der Zeitplaninformation und der von der Zeitgebereinrichtung (112) erzeugten gegenwärtigen Zeit und dem Datum zu betätigen, wenn ein vorbestimmtes eingehendes Rufanforderungssignal von der Basisstation (3) her empfangen wurde. 35

15. Funkkommunikationssystem für Sprach- oder Datenkommunikation zwischen zwei tragbaren Funktelefonen (1) innerhalb eines aus mehreren unterteilten Funkzonen gebildeten Dienstleistungsbezirks, aufweisend: 40

mehrere jeweils in den Funkzonen angeordnete Basisstationen (3); und  
eine mit jeder der Basisstationen verbundene Vermittlungsstation (4);  
wobei jede der Basisstationen (3) eine Funkkommunikationseinrichtung (6, 302, 301, 303, 305) zum Austausch von Signalen mit tragbaren Funktelefonen (1) in der unter Kontrolle der entsprechenden Basisstation befindlichen Funkzone aufweist und die Vermittlungsstation einen freien Kommunikationskanal festlegt, auf dem ein von dem tragbaren Funktelefon (1) innerhalb seiner eigenen Funkzone her empfangenes Kommunikationssignal an die Vermittlungsstation (4) übermittelt und ein von der Vermittlungsstation her empfangenes Kommunikationssignal an das tragbare Funktelefon innerhalb der genannten Funkzone übermittelt wird;  
wobei jedes der tragbaren Funktelefone (1) eine Funkkommunikationsschaltung (101-105) zur Funkübermittlung und zum Funkempfang von Sprach- oder Datensignalen zwischen dem entsprechenden tragbaren Funktelefon (1) und der Basisstation (3), die der Funkzone, in der sich das entsprechende Funktelefon befindet, zugeordnet ist, einen Empfänger (126) zur Erzeugung des Sprachsignals von der Funkkommunikationsschaltung, einen Übermittler (127) zur Lieferung des Sprachsignals von einem Benutzer an die Funkkommunikationsschaltung, eine Dateneingabeeinrichtung zur Eingabe von Daten (117, 118) und eine Signaleinrichtung zur Erzeugung eines Signaltons zur Benach- 45

richtung des Benutzers davon, daß von der Basisstation her ein eingehendes Rufsignal empfangen wurde, umfaßt,

dadurch **gekennzeichnet**, daß

die Funkkommunikationseinrichtung auf eine Rufanforderung von jeder der tragbaren Funktelefone anspricht, um der Vermittlungsstation (4) die in der Rufanforderung enthaltene Adresse des tragbaren Funktelefons der Gegenstelle zu übermitteln, während die Vermittlungsstation eine eingehende Rufanforderung an das tragbare Funktelefon übermittelt, das die Adresse der Gegenstelle aufweist und dadurch den freien Kommunikationskanal festlegt; die Vermittlungsstation einen Tabellenspeicher (411) zur Speicherung von Informationen über die Beziehung zwischen dem Kanal zu jeder Basisstation (3) und der Adresse jedes tragbaren Funktelefons aufweist, wodurch entsprechend der Anforderung einer beliebigen Basisstation Kanalverbindungen zwischen den Basisstationen aufgestellt werden; und jedes der tragbaren Funktelefone einen Zeitplanspeicher (116) zur Speicherung von über die Dateneingabeeinrichtung eingegebener Zeitplaninformation, eine Zeitgebereinrichtung (112) zur Erzeugung der gegenwärtigen Zeit und des Datums und einen Terminalprozessor (111) zum Betätigen der Signaleinrichtung entsprechend der Zeitplaninformation und der von der Zeitgebereinrichtung erzeugten gegenwärtigen Zeit und des Datums, wenn von der der Funkzone mit dem tragbaren Funktelefon zugeordneten Basisstation her ein eingehendes Rufsignal empfangen wurde, umfaßt.

16. Verwendung eines tragbaren Funktelefons in einem Funkkommunikationssystem nach Anspruch 15, wobei das tragbare Funktelefon folgendes umfaßt:

eine Funkkommunikationsschaltung (101-105) zur Aussendung und zum Empfang eines Sprachsignals auf einer Funkwelle von oder zu einer Basisstation (3), die einer Funkzone zugeordnet ist, innerhalb der sich das tragbare Funktelefon befindet;

einen Empfänger (126) zur Gewinnung von Schall aus dem von der Funkkommunikationsschaltung erhaltenen Sprachsignal;

einen Übertrager (127) zur Umwandlung von Sprache des Benutzers in das Sprachsignal, das der Funkkommunikationsschaltung übermittelt wird;

eine Dateneingabeeinrichtung zur Eingabe von Daten (117, 118);

einen Zeitplanspeicher (116) zur Speicherung

von über die Dateneingabeeinrichtung eingegebener Zeitplaninformation;

eine Zeitgebereinrichtung (112) zur Erzeugung der gegenwärtigen Zeit und des Datums;

eine Signaleinrichtung zur Erzeugung eines Signaltons, mit dem der Benutzer von dem Empfang eines eingehenden Rufsignals von der Basisstation her informiert wird; und

einen Terminalprozessor (111) zur Betätigung der Signaleinrichtung entsprechend der Zeitplaninformation und der von der Zeitgebereinrichtung erzeugten gegenwärtigen Zeit und des Datums, wenn von der Basisstation her, die der Funkzone, in der das tragbare Funktelefon angeordnet ist, das eingehende Rufsignal empfangen wurde.

17. Verwendung eines tragbaren Funktelefons nach Anspruch 16, wobei das tragbare Funktelefon (1) einen Speicher zur Aufzeichnung der Beziehung zwischen der Adresse jeder Basisstation und Ortsinformation aufweist und der Terminalprozessor (111) eine Einrichtung umfaßt, um die Signaleinrichtung entsprechend der Ortsinformation in dem Speicher, die mit der in dem eingehenden Rufsignal von der Basisstation enthaltenen Adresse der Basisstation in Beziehung steht, der Zeitplaninformation und der von der Zeitgebereinrichtung erzeugten gegenwärtigen Zeit und Datum zu steuern.
18. Verwendung eines tragbaren Funktelefons nach Anspruch 16, wobei das tragbare Funktelefon einen Speicher zur Aufzeichnung der Beziehung zwischen der Adresse jeder Basisstation und Ortsinformation aufweist und die Zeitplaninformation so aufstellt, daß mindestens die Zeitdaten und die Ortsdaten zueinander in Beziehung gesetzt werden, und wobei der Terminalprozessor (111) eine Einrichtung aufweist, um die Signaleinrichtung so zu steuern, daß ein von dem Signalton verschiedener Alarmton erzeugt wird, wenn die Ortsinformation des Speichers, die mit der in dem von der Basisstation während jeder bestimmten Zeitspanne übermittelten Steuersignal enthaltenen Adresse der Basisstation in Beziehung steht, von den in der Zeitplaninformation enthaltenen Ortsdaten verschieden ist.
19. Verwendung eines tragbaren Funktelefons nach Anspruch 16, wobei der Terminalprozessor (111) eine Einrichtung beinhaltet, um die Signaleinrichtung unabhängig von der Zeitplaninformation und von der Zeitgebereinrichtung (112) erzeugten gegenwärtigen Zeit und Datum zu betätigen, wenn ein vorbestimmtes eingehendes Rufanforderungssignal von der Basisstation (3) her empfangen wurde.

## Revendications

1. Système de radiocommunication pour établir une communication vocale ou une communication de données entre deux radiotéléphones portables (1) dans une zone de desserte constituée par une pluralité de zones radio divisées, comprenant:
  - des moyens formant relais (3, 4) pour réaliser une commande de connexion de voies de communication, et qui comportent une pluralité de stations de base (3) respectivement placées dans lesdites zones radio et un central (4) connecté à chacune desdites stations de base (3) chacune desdites stations de base (3) comportant des moyens de radiocommunication pour échanger des signaux avec des radiotéléphones portables (1) situés dans la zone radio sous le contrôle de la station de base correspondante, ledit central (4) établissant une voie de communication libre sur laquelle un signal de communication reçu du radiotéléphone portable (1) situé dans sa propre zone radio est transmis audit central (4) et sur laquelle un signal de communication reçu dudit central (4) est transmis au radiotéléphone portable (1) situé dans ladite zone radio; chacun desdits radiotéléphones portables (1) comportant un circuit de radiocommunication (101, 102, 103, 104, 105) pour émettre et recevoir par radio des signaux vocaux ou de données entre le radiotéléphone portable correspondant (1) et ladite station de base (3) attribuée à la zone radio dans laquelle se trouve ledit radiotéléphone correspondant (1), un récepteur (126) pour produire le signal vocal à partir dudit circuit de radiocommunication, un émetteur (127) pour fournir audit circuit de radiocommunication le signal vocal émis par un utilisateur, des moyens (117, 118) d'entrée de données pour indiquer un mode de communication téléphonique afin d'émettre et de recevoir le signal vocal vers ou de ladite station de base (3) ou un mode de communication de données pour l'émission ou la réception du signal de données, et entrer des données dans ledit mode de communication de données par l'utilisateur, des moyens (119, 120, 129, 160) de sortie de données pour produire des données destinées à l'utilisateur lors de ladite communication de données, une mémoire interne pour stocker un programme, et un processeur terminal (111) qui exécute ledit programme de façon que les données entrées par lesdits moyens d'entrée de données soient fournies sous un format audit circuit de radiocommunication et que les données provenant dudit circuit de radiocommunication soient fournies sous un certain format auxdits moyens de sortie de données;
  - caractérisé en ce que:
    - lesdits moyens de radiocommunication réagissent à une demande d'appel provenant de cha-

- cun desdits radiotéléphones portables (1) de façon à transmettre audit central (4) l'adresse du radiotéléphone portable du correspondant figurant dans ladite demande d'appel, tandis que ledit central (4) transmet une demande d'appel arrivant au radiotéléphone portable (1) ayant l'adresse du correspondant, et établit de ce fait ladite voie de communication libre;
  - ledit central (4) comporte une mémoire (411) de tables pour stocker des informations concernant la relation entre la voie jusqu'à chaque station de base (3) et l'adresse de chaque radiotéléphone portable (1), établissant de ce fait la connexion de voies entre les stations de base (3) en fonction de la demande émanant d'une station sélectionnée arbitrairement parmi lesdites stations de base (3); et
  - une unité centrale (2) de traitement de données est prévue pour traiter des données reçues dudit central (4), ladite unité centrale (2) de traitement de données étant reliée audit central (4) et comportant une mémoire centrale (202) pour stocker des données reçues dudit central (4) et un processeur central (201) pour traiter lesdites données, ladite unité centrale (2) de traitement de données étant reliée auxdites stations de base (3) lorsque ledit central (4) reçoit des données d'une station de base (3) sélectionnée arbitrairement parmi lesdites stations de base.
2. Système de radiocommunication selon la revendication 1, dans lequel ledit radiotéléphone portable (1) comporte une première mémoire (114-116) pour ajouter un drapeau aux données entrées par lesdits moyens d'entrée de données et stocker en tant que premières données lesdites données complétées par un drapeau, et une seconde mémoire (113) pour stocker temporairement, en tant que secondes données, les données à transmettre à ladite station de base (3), ledit processeur terminal comporte un moyen pour extraire de ladite première mémoire, pendant un laps de temps prédéterminé, lesdites premières données pourvues dudit drapeau, stocker celles-ci en tant que dites secondes données dans ladite seconde mémoire, et supprimer le drapeau desdites premières données stockées dans ladite première mémoire après avoir transmis lesdites secondes données à ladite station de base.
3. Système de radiocommunication selon la revendication 2, dans lequel ladite unité centrale (2) de traitement de données comporte un moyen pour commander ladite mémoire centrale afin de stocker lesdites secondes données reçues par l'intermédiaire dudit moyen formant relais (3, 4) et provenant dudit radiotéléphone portable, ledit processeur central comporte un moyen pour copier lesdites secondes données et renvoyer lesdites données copiées



- audit radiotéléphone portable par l'intermédiaire desdits moyens formant relais, ledit processeur terminal dudit radiotéléphone portable comporte un moyen pour comparer lesdites données copiées et les secondes données de ladite seconde mémoire et transmettre le résultat à ladite unité centrale de traitement de données, et ladite unité centrale de traitement de données comporte un moyen pour supprimer de ladite mémoire centrale lesdites secondes données si le résultat de la comparaison aboutit à une différence.
4. Système de radiocommunication selon la revendication 3, dans lequel ledit radiotéléphone portable (1) comporte un moyen pour supprimer lesdites secondes données ou transmettre à nouveau lesdites secondes données à ladite unité (2) de traitement de données lorsque ledit résultat de la comparaison aboutit à une différence.
5. Système de radiocommunication selon la revendication 1, dans lequel ledit processeur central de ladite unité centrale (2) de traitement de données comporte un moyen pour traiter les données stockées dans ladite mémoire centrale (202) en fonction d'un signal de demande reçu dans ledit mode de communication de données en provenance dudit radiotéléphone portable (1), par l'intermédiaire desdits moyens formant relais (4, 3), et pour transmettre le résultat dudit traitement au radiotéléphone portable indiqué par ledit signal de demande.
6. Système de radiocommunication selon la revendication 1, dans lequel ledit processeur terminal (111) dudit radiotéléphone portable (1) comporte un moyen pour transmettre à ladite station de base des données comportant un mot de passe entré par lesdits moyens d'entrée de données, et ledit processeur central (201) de ladite unité centrale (2) de traitement de données comporte un moyen pour supprimer lesdites données de ladite mémoire centrale lorsque les données reçues, par l'intermédiaire desdits moyens formant relais, d'un radiotéléphone portable sélectionné arbitrairement parmi lesdits radiotéléphones portables ne comportent pas ledit mot de passe.
7. Système de radiocommunication selon la revendication 1, dans lequel ledit radiotéléphone portable (1) possède une mémoire pour stocker des données entrées par lesdits moyens d'entrée (117, 118) de données, ledit processeur terminal (111) comporte un moyen pour transmettre à ladite unité centrale (2) de traitement de données, par l'intermédiaire desdits moyens formant relais, des informations contenant lesdites données et l'adresse stockées dans ladite mémoire, et ledit processeur central (201) de ladite unité centrale (2) de traitement de données comporte un moyen pour commander ladite mémoire centrale afin de stocker les données figurant dans lesdites informations, en tant que premières données, en association avec ladite adresse, extraire dudit radiotéléphone portable (1), par l'intermédiaire desdits moyens formant relais (4, 3) pendant chaque période prédéterminée, les données indiquées en tant que secondes données par ladite adresse, comparer lesdites premières données et les secondes données et mettre à jour lesdites premières données dans ladite mémoire centrale et lesdites secondes données en fonction du résultat de la comparaison.
8. Système de radiocommunication selon la revendication 1, dans lequel ledit radiotéléphone portable (1) comporte une horloge (112) pour indiquer l'heure instantanée, et une mémoire pour stocker les données entrées à l'aide desdits moyens d'entrée de données, et ledit processeur terminal (111) comporte un moyen pour transmettre à ladite unité centrale (2) de traitement de données, par l'intermédiaire desdits moyens formant relais, des informations comportant lesdites données, l'adresse à laquelle lesdites données sont stockées dans la mémoire et l'instant auquel lesdites données sont produites, ledit processeur central (201) de ladite unité centrale (2) de traitement de données comporte un moyen pour commander ladite mémoire centrale (202) afin de stocker les données figurant dans lesdites informations, en tant que premières données, en association avec ladite adresse et ledit instant de production de données, lire, pendant chaque période prédéterminée, les données désignées par ladite adresse provenant de ladite mémoire dudit radiotéléphone portable (1), par l'intermédiaire desdits moyens formant relais, en tant que secondes données, comparer l'instant de la production desdites premières données avec celui desdites secondes données, et permettre à ladite mémoire centrale de stocker des données d'un instant de production plus récent.
9. Utilisation d'un radiotéléphone portable dans un système de radiocommunication selon l'une quelconque des revendications 1 à 8,
- ledit radiotéléphone portable comprenant: un circuit (104, 103, 101, 102, 105) de radiocommunication pour émettre et recevoir par radio des signaux vocaux ou des signaux de données entre le radiotéléphone portable correspondant (1) et une station de base (3) qui est affectée à la zone radio dans laquelle se trouve ledit radiotéléphone correspondant; un récepteur pour produire un signal vocal à partir dudit circuit de radiocommunication; un émetteur (127) pour fournir audit circuit de

- radiocommunication le signal vocal provenant d'un utilisateur;  
des moyens (117, 118) d'entrée de données pour indiquer un mode de communication vocale pour émettre et recevoir le signal vocal vers ou de ladite station de base ou un mode de communication de données pour l'émission ou la réception d'un signal de données, et faire entrer, par l'utilisateur, des données dans ledit mode de communication de données;  
des moyens (119, 120) de sortie de données pour produire pour l'utilisateur des données dans ledit mode de communication de données;  
une mémoire interne pour stocker un programme; et  
un processeur terminal (111) qui exécute ledit programme de façon que les données entrées par ledit moyen d'entrée de données soient fournies sous un format audit circuit de radiocommunication et que les données provenant dudit circuit de radiocommunication soient fournies sous un certain format auxdits moyens de sortie de données.
10. Utilisation d'un radiotéléphone portable selon la revendication 9, ledit radiotéléphone portable comportant une mémoire pour ajouter un code, indiquant l'autorisation ou l'interdiction de la transmission de données à ladite unité de traitement de données, aux données entrées par lesdits moyens d'entrée/sortie de données et pour stocker les données complétées par un code, et ledit processeur terminal (111) comporte un moyen pour transmettre de manière automatique à ladite station de base, suivant une périodicité prédéterminée, uniquement les données complétées par un code indiquant l'autorisation de transmission desdites données.
11. Utilisation d'un radiotéléphone portable selon la revendication 9, ayant un moyen formant horloge (112) pour produire l'heure exacte et une date, une mémoire (116) de programme pour stocker des informations de programme entrées à l'aide desdits moyens (117, 118) d'entrée de données, et un moyen formant sonnerie pour produire un signal sonore de sonnerie par lequel l'utilisateur est informé de ce qu'il a reçu un signal d'appel arrivant de ladite station de base, ledit processeur terminal (111) comportant un moyen pour commander ledit moyen de sonnerie en fonction desdites informations de programme, et l'heure exacte et la date produites par ledit moyen formant horloge lorsque ledit processeur terminal (111) reçoit dans ledit mode de communication téléphonique le signal d'appel arrivant de ladite station de base (3) qui est affectée à la zone radio dans laquelle se trouve ledit radiotéléphone portable (1).
12. Utilisation d'un radiotéléphone portable selon la revendication 11, ayant une mémoire pour stocker la relation entre l'adresse de chaque station de base et des informations de localisation, ledit processeur terminal (111) comportant un moyen pour commander ledit moyen de sonnerie en fonction desdites informations de localisation présentes dans ladite mémoire, desdites informations de programme et de l'heure exacte et de la date produites par ledit moyen formant horloge, qui sont liées à l'adresse de ladite station de base (3) figurant dans ledit signal d'appel arrivant de ladite station de base.
13. Utilisation d'un radiotéléphone portable selon la revendication 11, ayant une mémoire pour stocker la relation entre l'adresse de chaque station de base et les informations de localisation et un moyen pour associer lesdites informations de programme au moins avec les données horaires et les données de localisation, ledit processeur terminal (111) comportant un moyen pour commander ledit moyen de sonnerie afin de déclencher une alerte sonore différente dudit signal de sonnerie lorsque les informations de localisation présentes dans ladite mémoire qui correspondent avec l'adresse de ladite station de base figurant dans un signal de commande transmis depuis la station de base pendant chaque période prédéterminée sont différentes des données de localisation figurant dans lesdites informations de programme.
14. Utilisation d'un radiotéléphone portable selon la revendication 11, dans lequel ledit processeur terminal (111) comporte un moyen pour actionner ledit moyen de sonnerie indépendamment desdites informations de programme et de l'heure exacte et de la date produites par ledit moyen formant horloge (112), après avoir reçu un signal prédéterminé de demande d'appel arrivant transmis par ladite station de base (3).
15. Système de radiocommunication pour établir une communication téléphonique ou une communication de données entre deux radiotéléphones portables (1) situés dans une zone de desserte constituée par une pluralité de zones radio divisées, comprenant:
- une pluralité de stations de base (3) respectivement placées dans lesdites zones radio; et  
un central (4) relié à chacune desdites stations de base;  
chacune desdites stations de base (3) ayant un moyen de radiocommunication (6, 302, 301, 303, 305) pour échanger des signaux avec des radiotéléphones portables (1) situés dans la zone radio sous le contrôle de la station de base correspondante, ledit central établissant une

voie de communication libre sur laquelle un signal de communication reçu du radiotéléphone portable (1) présent dans sa propre zone radio est transmis audit central (4) et sur laquelle un signal de communication reçu dudit central est transmis au radiotéléphone portable (1) présent dans ladite zone radio;

chacun desdits radiotéléphones portables (1) comportant un circuit de radiocommunication (101-105) pour émettre et recevoir par radio des signaux vocaux ou des données entre le radiotéléphone portable correspondant (1) et ladite station de base (3) qui est affectée à la zone radio dans laquelle se trouve ledit radiotéléphone correspondant, un récepteur (126) pour produire le signal vocal à partir dudit signal de radiocommunication, un émetteur (127) pour fournir audit circuit de communication radio le signal vocal émis par un utilisateur, des moyens d'entrée de données pour entrer des données (117, 118), et un moyen de sonnerie pour produire un signal sonore de sonnerie afin d'aviser l'utilisateur de ce qu'il a reçu un signal d'appel arrivant de ladite station de base, caractérisé en ce que:

ledit moyen de radiocommunication réagit à une demande d'appel émanant de chacun des radiotéléphones portables pour transmettre audit central (4) l'adresse du radiotéléphone portable du correspondant figurant dans ladite demande d'appel, tandis que ledit central transmet au radiotéléphone portable une demande d'appel arrivant comportant l'adresse du correspondant, et établit de ce fait ladite voie de communication libre;

ledit central a une mémoire (411) de tables pour stocker des informations concernant les relations entre la voie jusqu'à chaque station de base (3) et l'adresse de chaque radiotéléphone portable, en réalisant de ce fait une connexion des voies entre les stations de base en fonction de la demande émanant de l'une desdites stations de base sélectionnée de façon arbitraire; et chacun desdits radiotéléphones portables comporte une mémoire (116) de programme pour stocker des informations de programme entrées à partir desdits moyens d'entrée de données, un moyen formant horloge (112) pour produire l'heure exacte et la date, et un processeur terminal (111) pour faire fonctionner ledit moyen de sonnerie en fonction desdites informations de programme et de l'heure exacte et de la date produites par ledit moyen formant horloge à la réception d'un signal d'appel arrivant provenant de la station de base affectée à la zone radio comportant ledit radiotéléphone portable.

16. Utilisation d'un radiotéléphone portable dans un système de radiocommunication selon la revendication 15, ledit radiotéléphone portable comprenant

un circuit de radiocommunication (101-105) pour émettre et recevoir un signal vocal sur une onde radio vers et d'une station de base (3) qui est affectée à une zone radio dans laquelle se trouve ledit radiotéléphone portable;

un récepteur (126) pour émettre du son du signal vocal issu dudit circuit de radiocommunication;

un émetteur (127) pour convertir la voix de l'utilisateur en signal vocal transmis audit circuit de radiocommunication;

des moyens d'entrée de données pour entrer des données (117, 118);

une mémoire de programme pour stocker des informations entrées par l'intermédiaire desdits moyens d'entrée de données;

un moyen formant horloge (112) pour produire l'heure exacte et la date;

un moyen de sonnerie pour produire un signal sonore de sonnerie par lequel l'utilisateur est informé de ce qu'il a reçu de la station de base un signal d'appel arrivant; et

un processeur terminal (111) pour actionner ledit moyen de sonnerie suivant lesdites informations de programme et l'heure précise et la date produites par ledit moyen formant horloge après avoir reçu le signal d'appel arrivant de la station de base affectée à la zone radio dans laquelle se trouve ledit radiotéléphone portable.

17. Utilisation d'un radiotéléphone portable selon la revendication 16, ledit radiotéléphone portable (1) ayant une mémoire pour enregistrer la relation entre l'adresse de chaque station de base et des informations de localisation, et ledit processeur terminal (111) comporte un moyen pour commander ledit moyen de sonnerie en fonction des informations de localisation présentes dans ladite mémoire, lesquelles informations correspondent à l'adresse de ladite station de base figurant dans le signal d'appel arrivant provenant de ladite station de base, lesdites informations de programme, et l'heure exacte et la date produites par ledit moyen formant horloge.

18. Utilisation d'un radiotéléphone portable selon la revendication 16, ledit radiotéléphone portable ayant une mémoire pour enregistrer la relation entre l'adresse de chaque station de base et des informations de localisation, et établissant lesdites informations de programme de façon qu'au moins les données horaires et les données de localisation soient associées les unes aux autres, et ledit processeur

terminal (111) comportant un moyen pour commander ledit moyen de sonnerie afin de produire des alertes sonores différentes dudit signal sonore de sonnerie lorsque les informations de localisation de ladite mémoire associées à l'adresse de ladite station de base (3) figurant dans le signal de commande transmis depuis la station de base pendant chaque période prédéterminée sont différentes des données de localisation figurant dans lesdites informations de programme.

19. Utilisation d'un radiotéléphone portable selon la revendication 16, ledit processeur terminal (111) comportant un moyen pour actionner ledit moyen de sonnerie indépendamment desdites informations de programme et de l'heure exacte et de la date produites par ledit moyen formant horloge (112) après avoir reçu de ladite station de base (3) un signal prédéterminé de demande d'appel arrivant.

FIG. 1

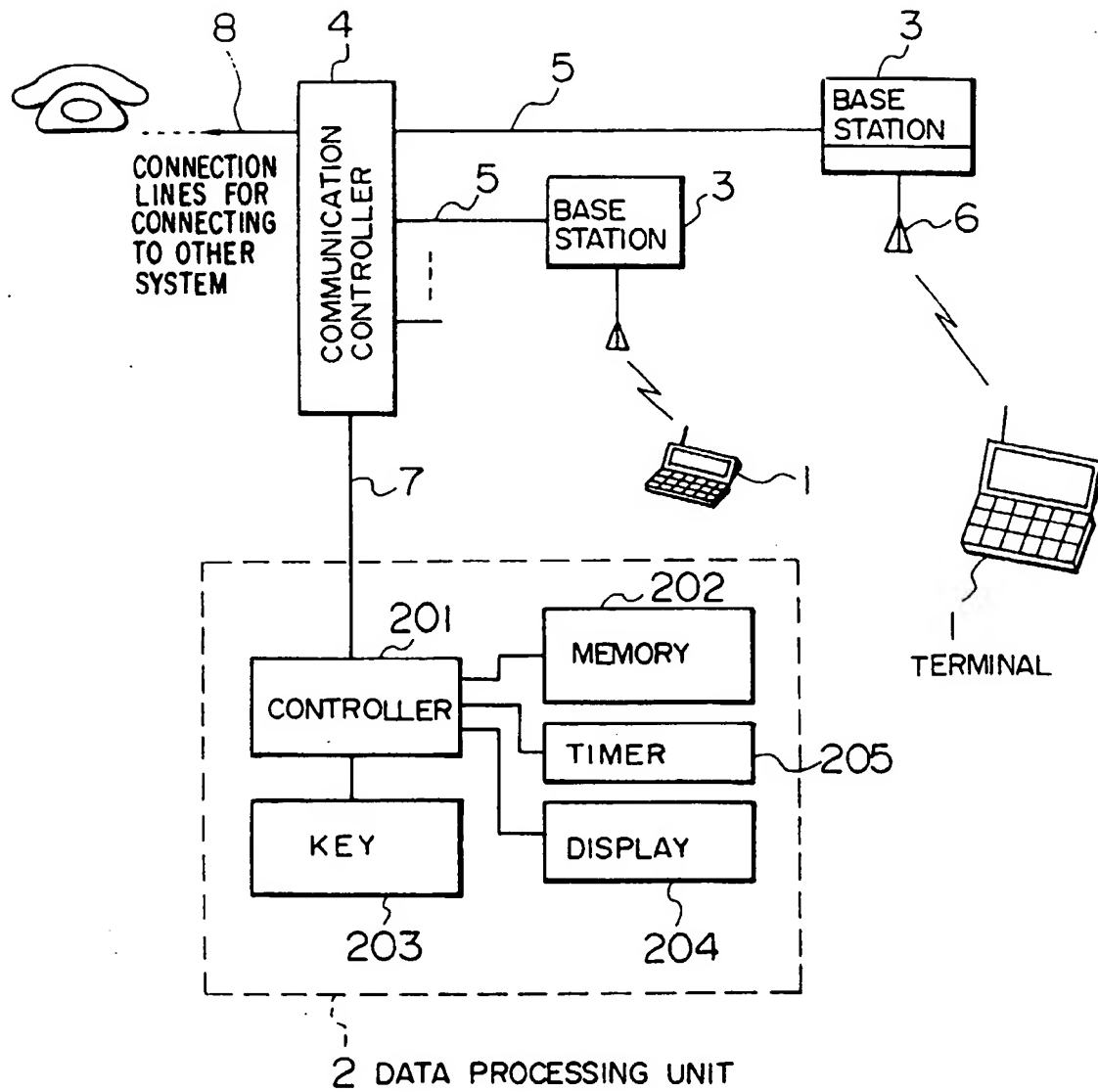


FIG. 2

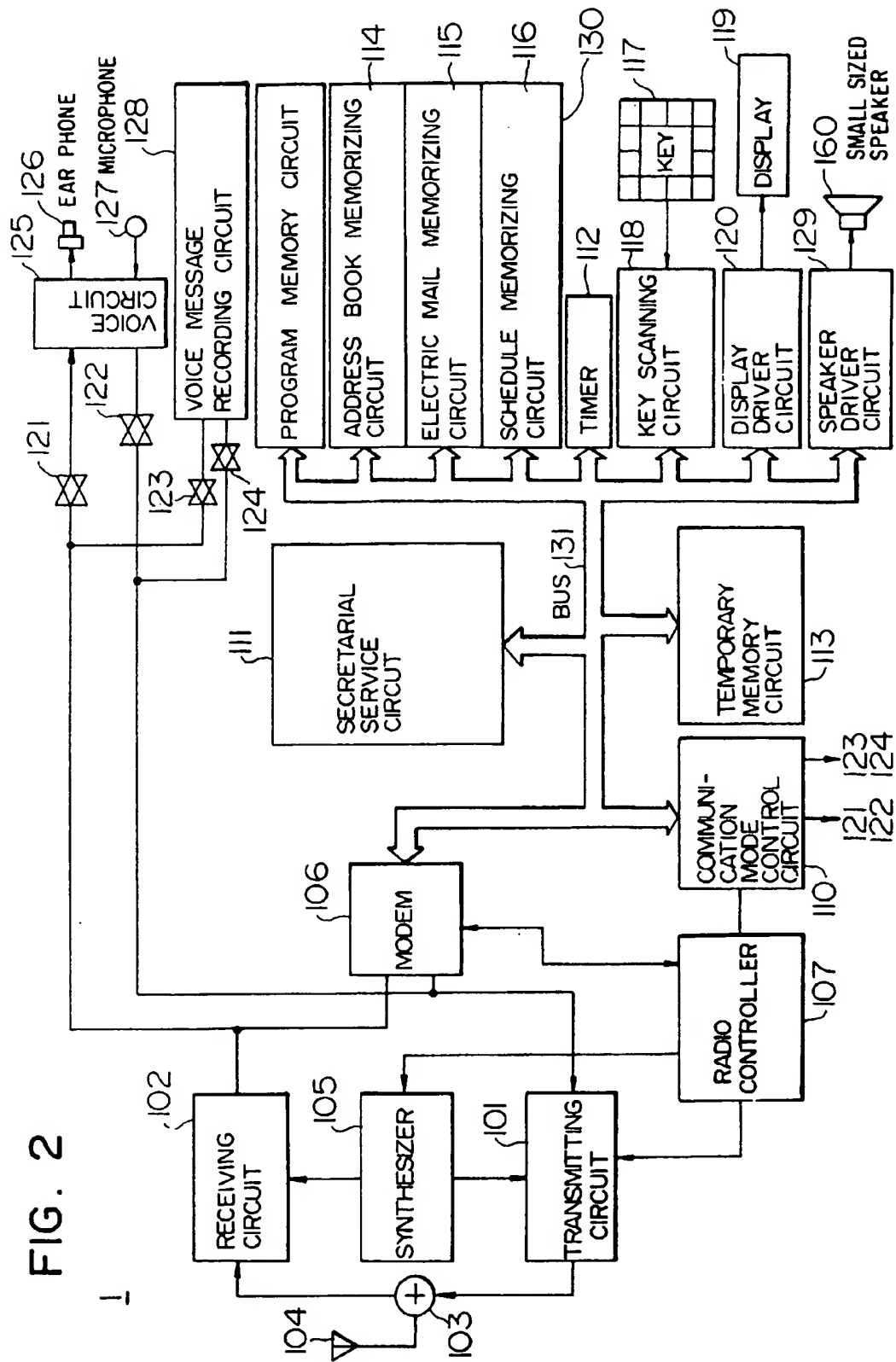


FIG. 3

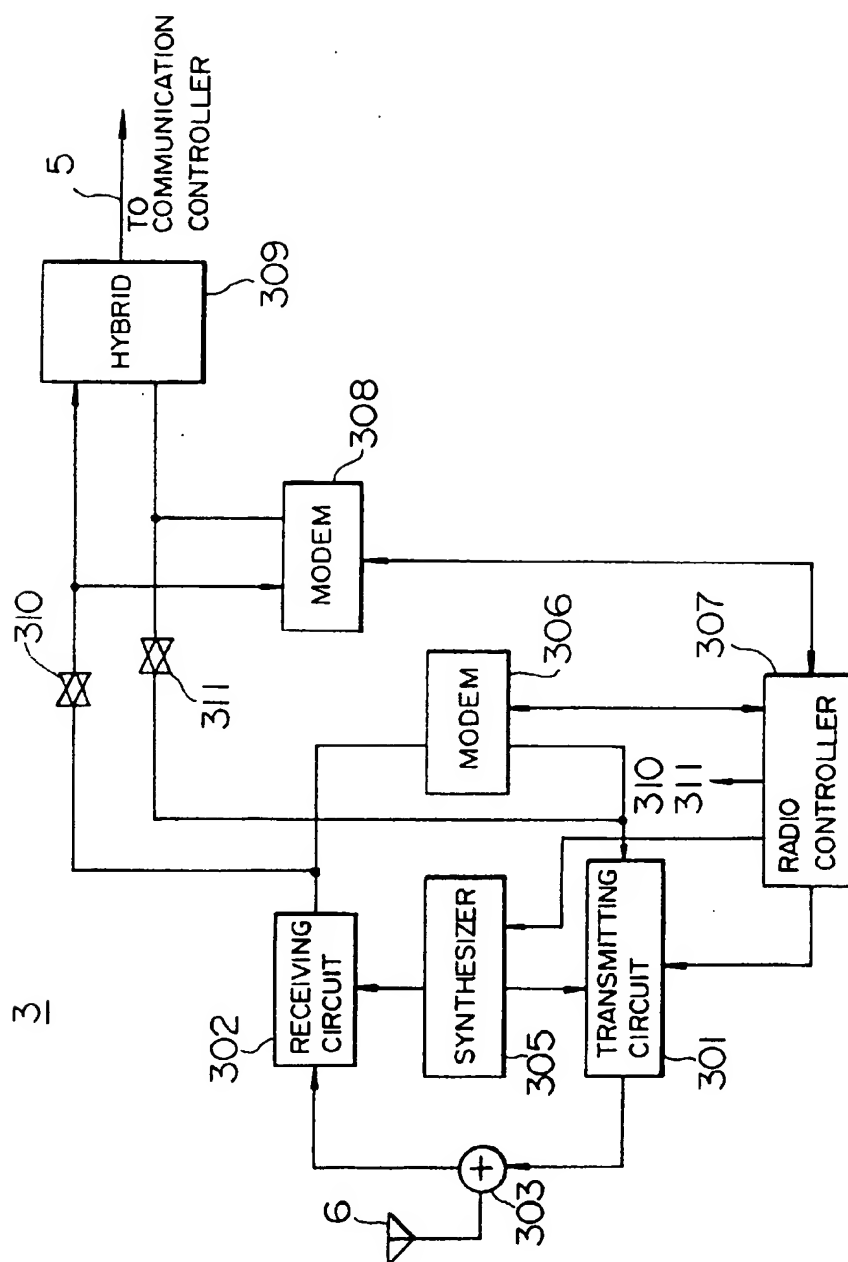




FIG. 4

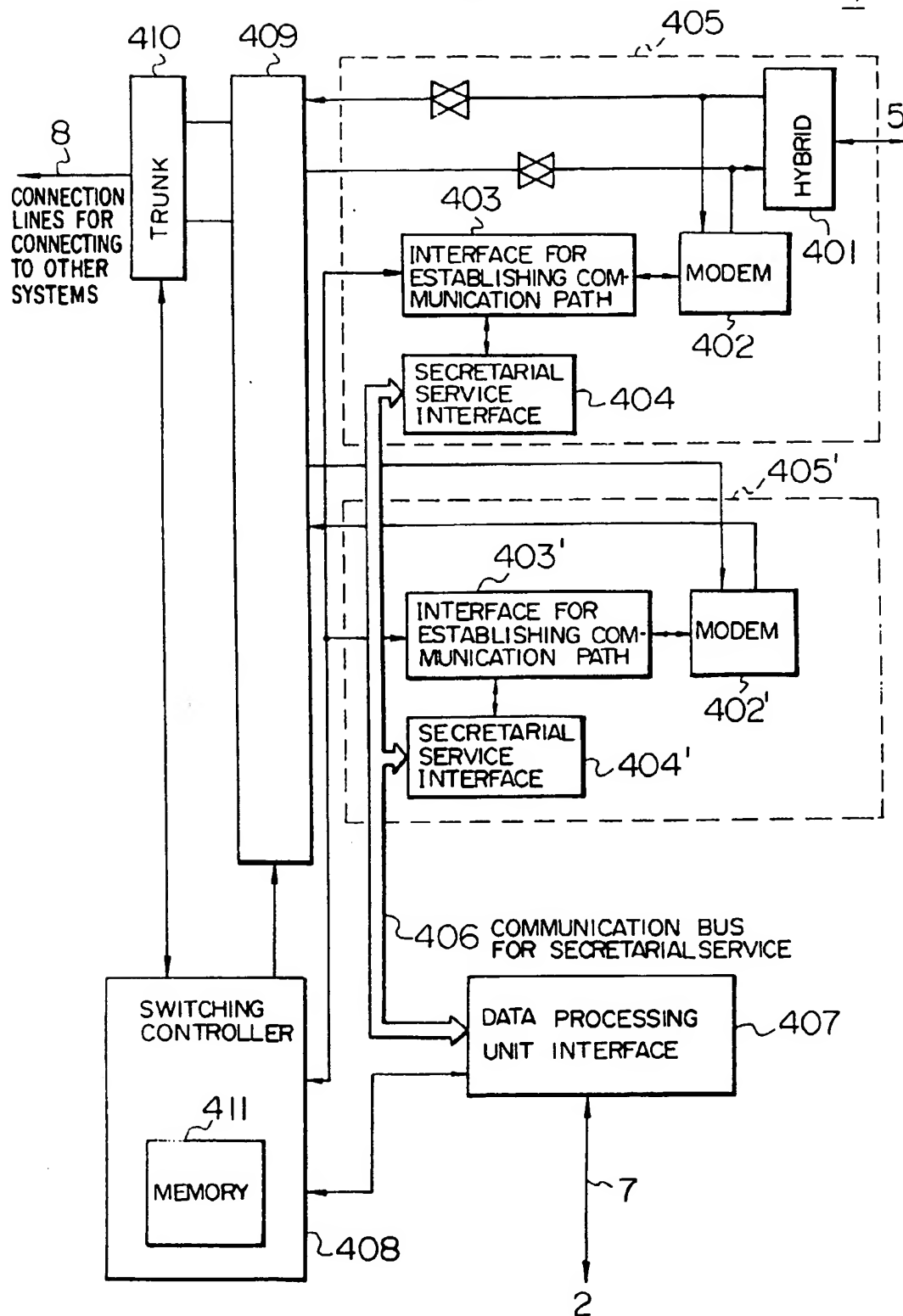


FIG. 5

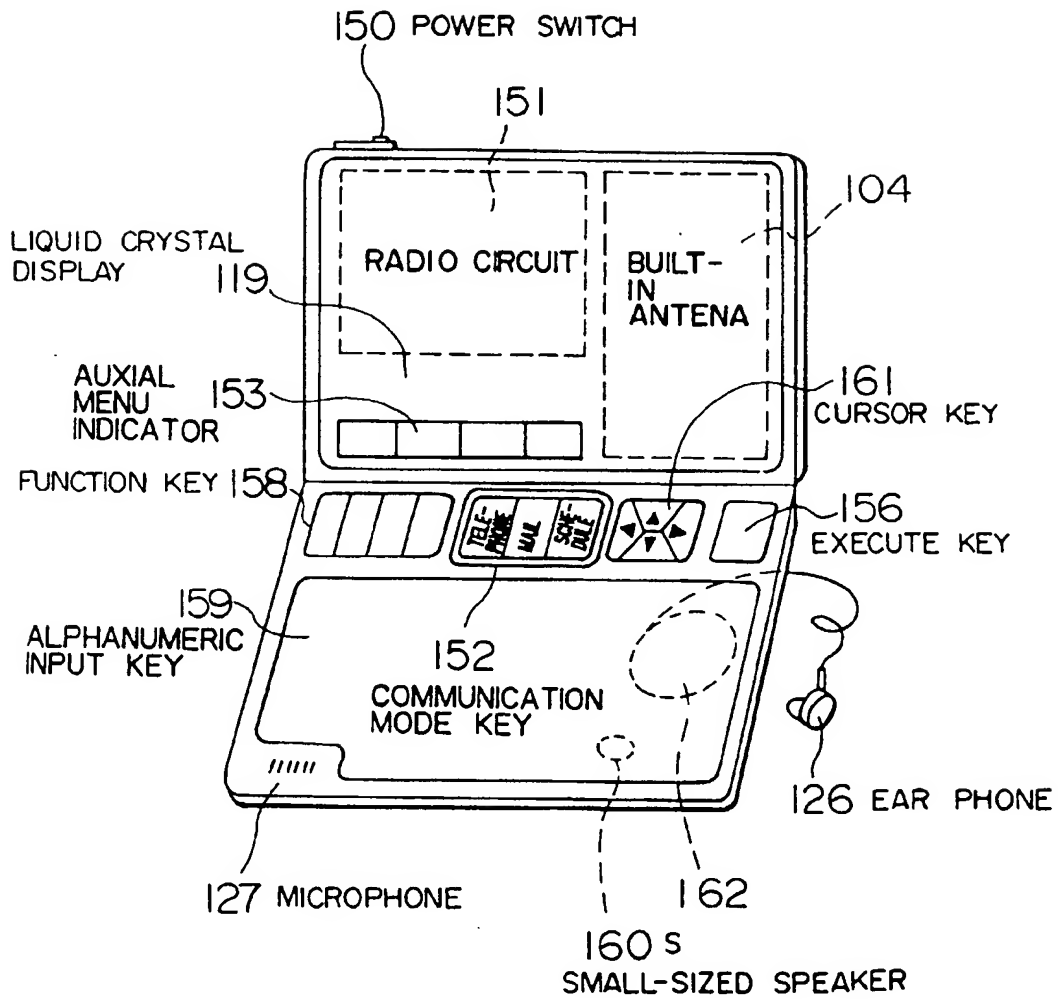


FIG. 6

THE DAY FOR A MEETING ?

1989 / 5 / 24 ~ 1989 / 5 / 26 EXECUTE

THE SCHEDULING NAME FOR THE MEETING ?

o o o EXECUTE

PURPOSE ?

x x x EXECUTE

PLACE ? (NOTE) — INDICATES OPERATE INPUT KEY

Δ Δ Δ EXECUTE

ATTENDANCE THE GRADE OF IMPORTANCE ?

A	III	<u>EXECUTE</u>
B	II	<u>EXECUTE</u>
		⋮
		<u>EXECUTE</u>

LIQUID CRYSTAL DISPLAY

FIG. 7

<PREPARING A DRAFT OF SCHEDULE>

PERIOD 1989/5/24 ~ 1989/5/26

THE SCHEDULING NAME

PURPOSE :

PLACE :

ATTENDANCE AND THE GRADE OF IMPORTANCE

NAME	THE GRADE OF IMPORTANCE	NAME	THE GRADE OF IMPORTANCE
A	III	E	II
B	II	F	III
C	I	.	.
D	II	.	.

DO YOU SEND THIS SCHEDULE ? Y / N

LIQUID CRYSTAL DISPLAY

FIG. 8

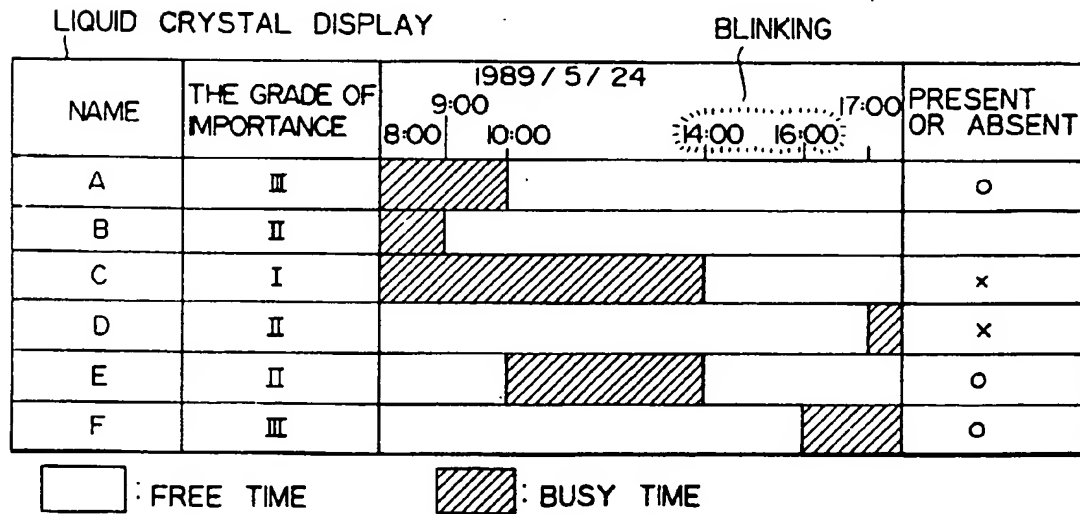


FIG. 9

THE DAY FOR : 1989 / 5 / 24  
 A MEETING :  
 TIME : 14:00 ~ 16:00  
 THE SCHEDULING NAME: o o o  
 PURPOSE : x x x  
 PLACE : Δ Δ Δ  
 ATTENDANCES :

NAME	NAME	NAME
A	D	
B	E	
C	F	

PRESENT OR ABSENT ? : Y

— INDICATES "OPERATE INPUT KEY" LIQUID CRYSTAL DISPLAY

FIG. 10

THE DAY OF SCHEDULE FOR DISPLAYING ?  
 1989 / 5 / 26      **EXECUTE**

— INDICATES "OPERATE INPUT KEY" LIQUID CRYSTAL DISPLAY

FIG. 11

1989 / 5 / 26				
TIME	THE SCHEDULING NAME	TRANSMITTER	THE GRADE OF IMPORTANCE	PRESENT OR ABSENCE
9:00~12:00	x x x	X	III	Y
10:00~11:00	Δ Δ Δ	Y	II	N
10:30~12:00	▽ ▽ ▽	Z	I	N
16:00~18:00	o o o	P	II	
18:00~19:00	□ □ □	Q	I	

LIQUID CRYSTAL DISPLAY

FIG. 12

FIXING OF SCHEDULE		
THE SCHEDULING NAME	DATE OF MEETING	TIME
Δ Δ Δ	1989 / 5 / 24	12:00 14:00
x x x	1989 / 5 / 26	9:00 10:00
▽ ▽ ▽	1989 / 5 / 26	15:00 17:00

LIQUID CRYSTAL DISPLAY

FIG. 13

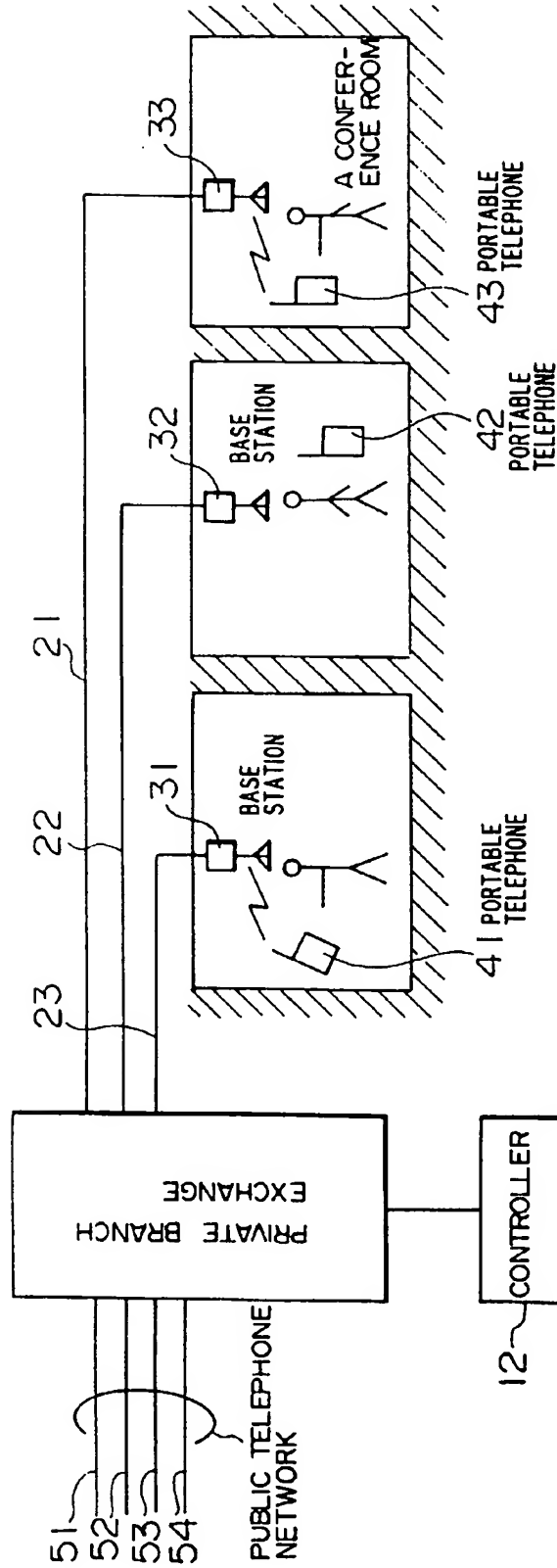


FIG. 14

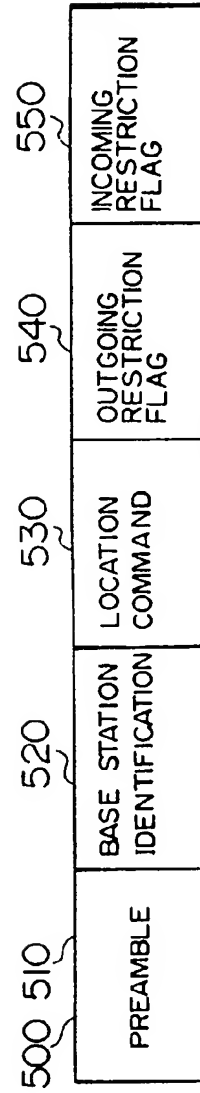




FIG. 15

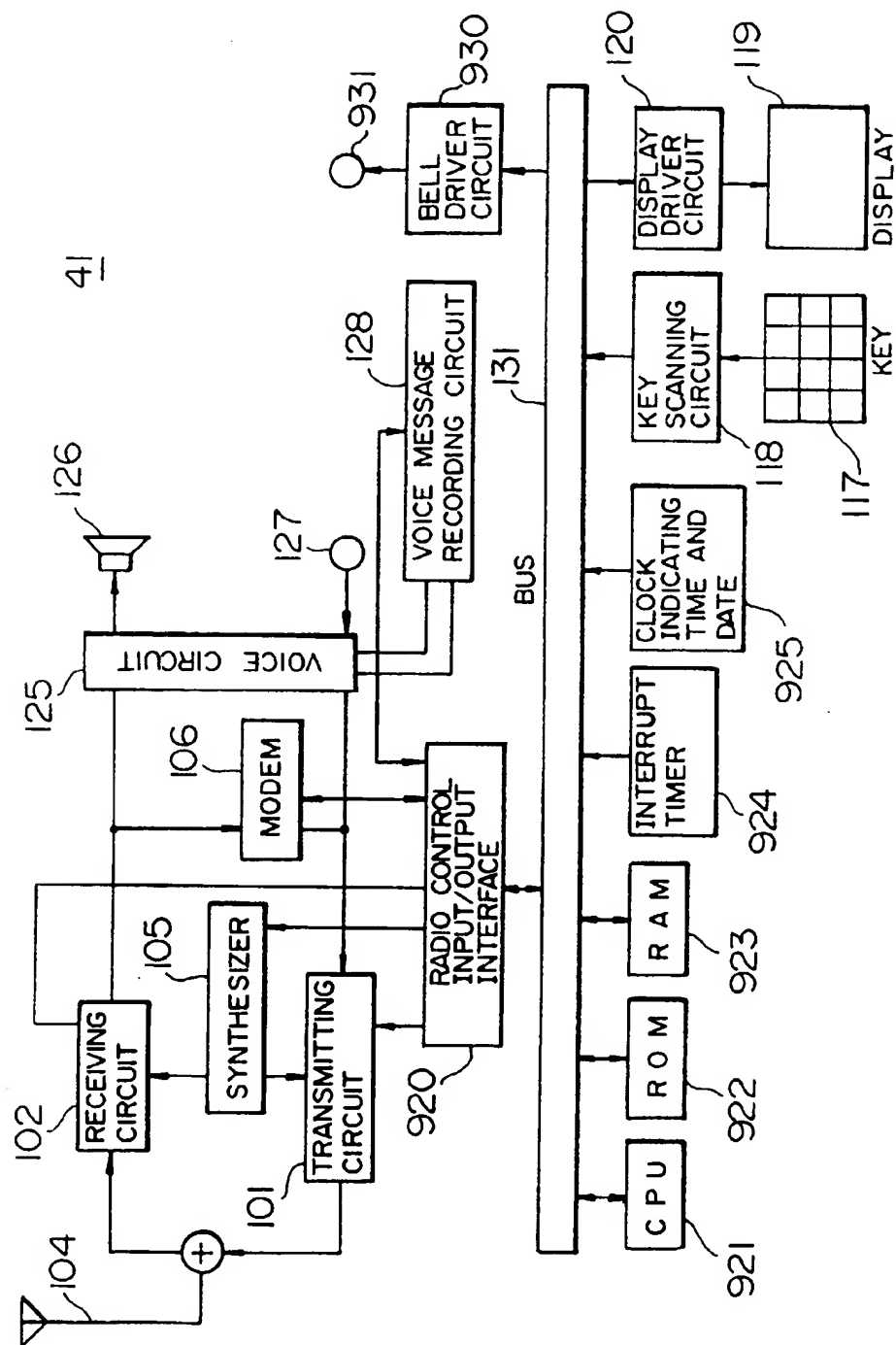


FIG. 16

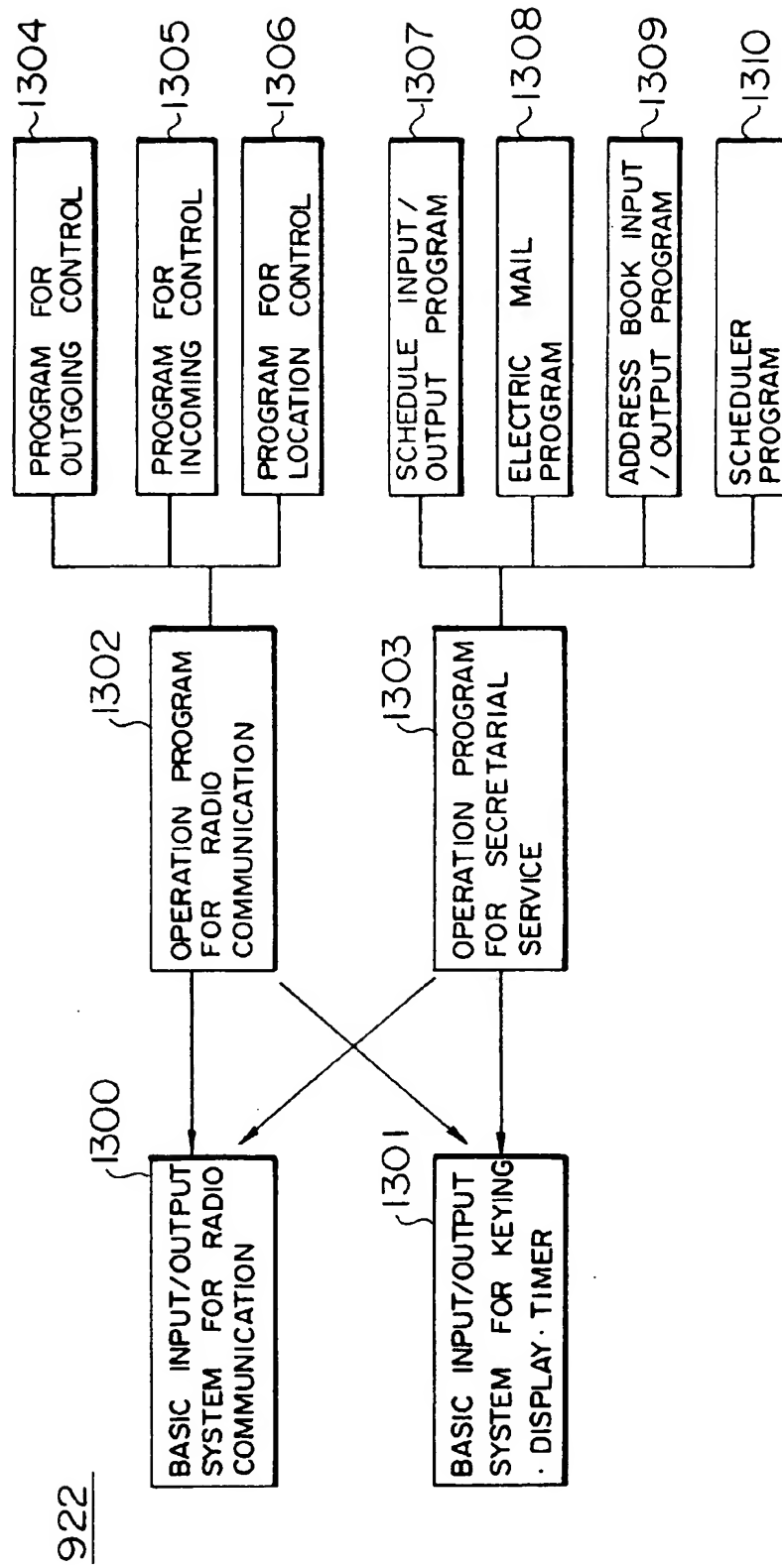


FIG. 17

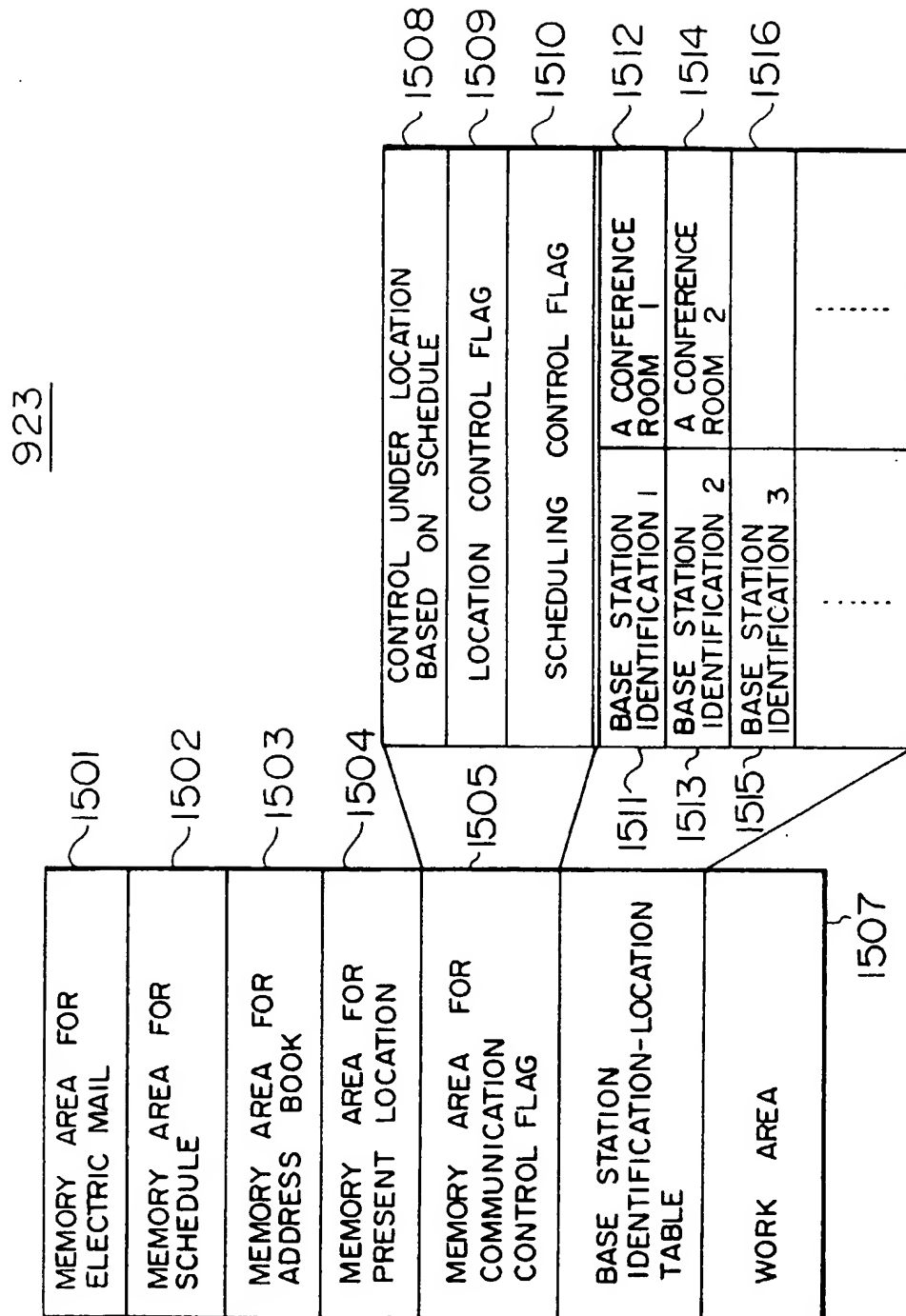


FIG. 18

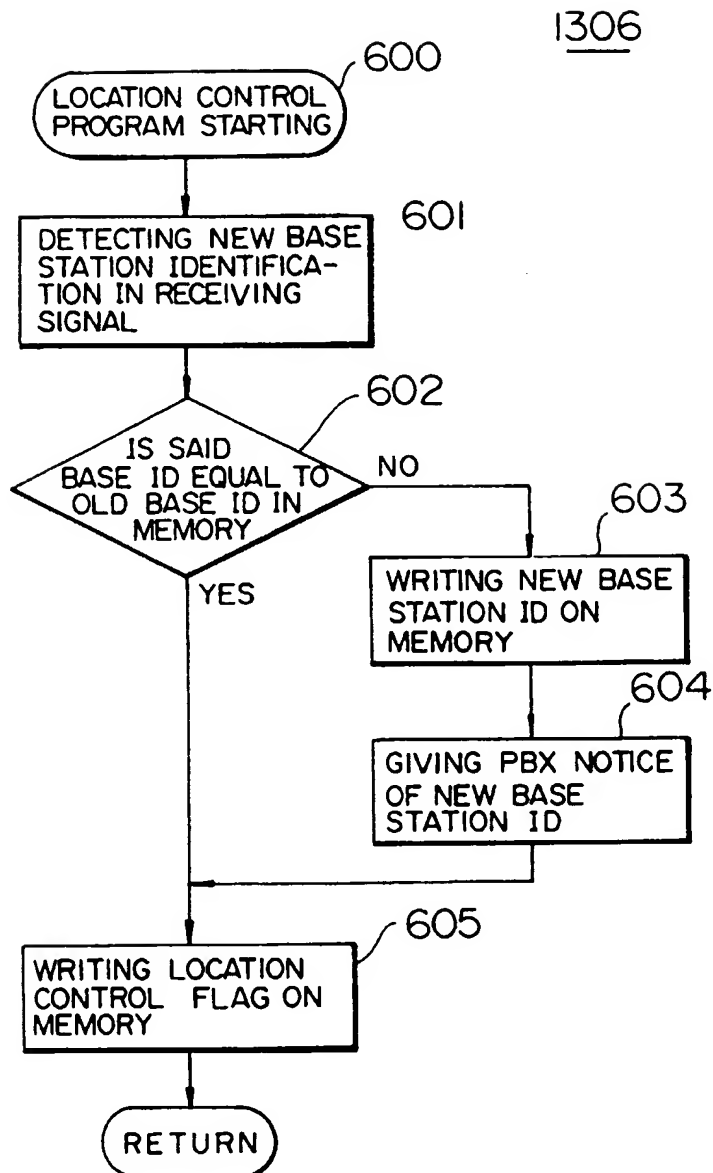


FIG. 19

START TIME	END TIME	CONTENT	PLACE	INCOMING RESTRICTION LEVEL	OUTGOING RESTRICTION LEVEL	LOCATION CALLING
10 : 00 : : : : : : : : :	12 : 00 : : : : : : : : :	PREVIOUS ARRANGEMENT : : : : : : : : :	FIRST CONFERENCE ROOM : : : : : : : : :	NON RINGING : : : : : : : : :	NON VOICE COMMUNICATION : : : : : : : : :	ON : : : : : : : : :

FIG. 20

	COMMUNICATION WITH RINGING	COMMUNICATION WITH NON-RINGING
VOICE FREQUENCY COMMUNICATION	TALKING	VOICE MESSAGE
NON VOICE FREQUENCY COMMUNICATION	ELECTRIC MAIL WITH RINGING	ELECTRIC MAIL

FIG. 21

RECEIVING PROHIBITION FLAG	RINGING PROHIBITION FLAG	VOICE COMMUNICATION PROHIBITION FLAG
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FIG. 22

CALL RESTRICTION BY SCHEDULING	CALL RESTRICTION BY LOCATION	OPERATION
NO	YES	RESTRICTION BY LOCATION
YES	NO	RESTRICTION BY SCHEDULE
YES	YES	RESTRICTION BY SCHEDULE

FIG. 23

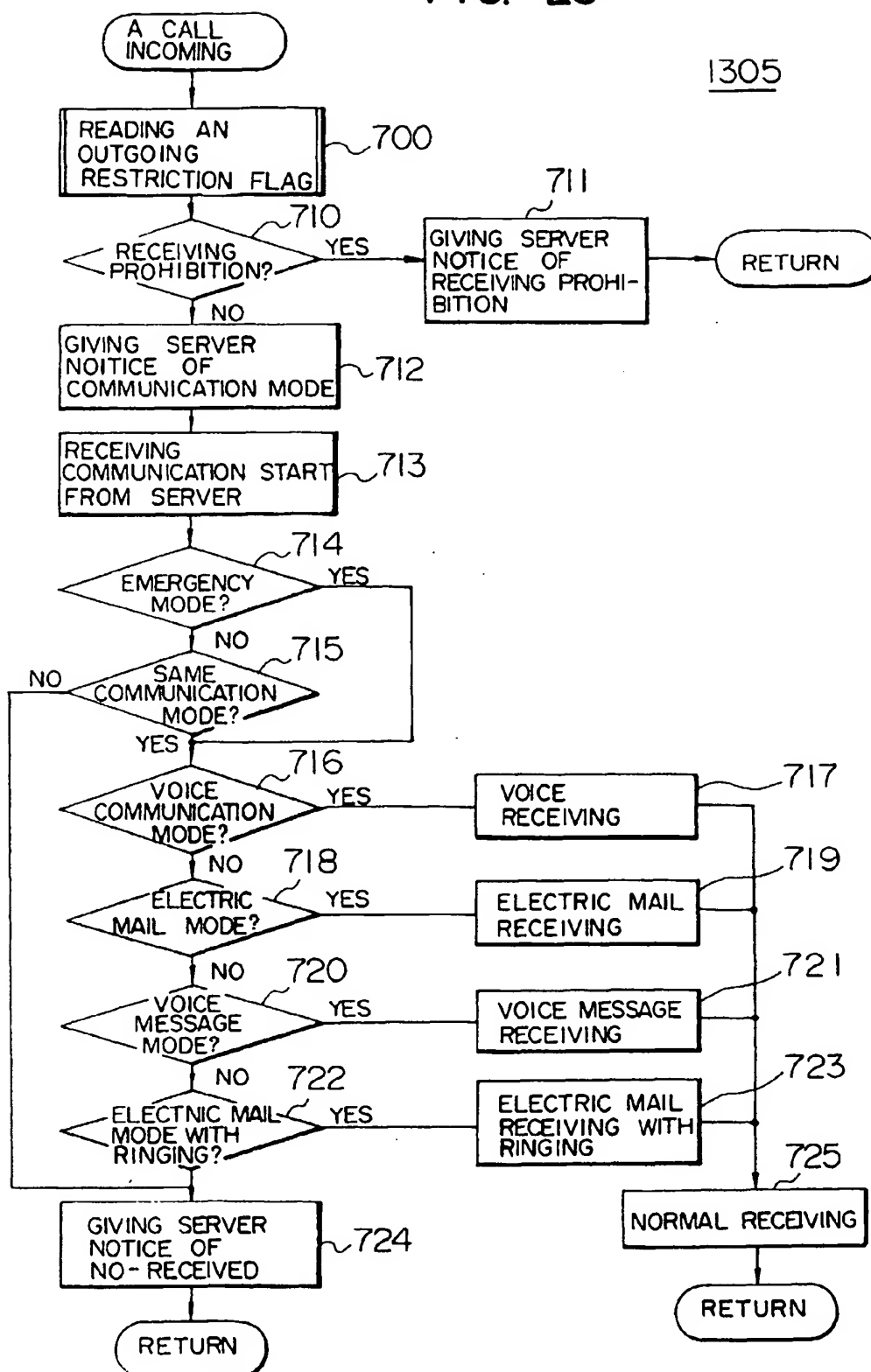


FIG. 24

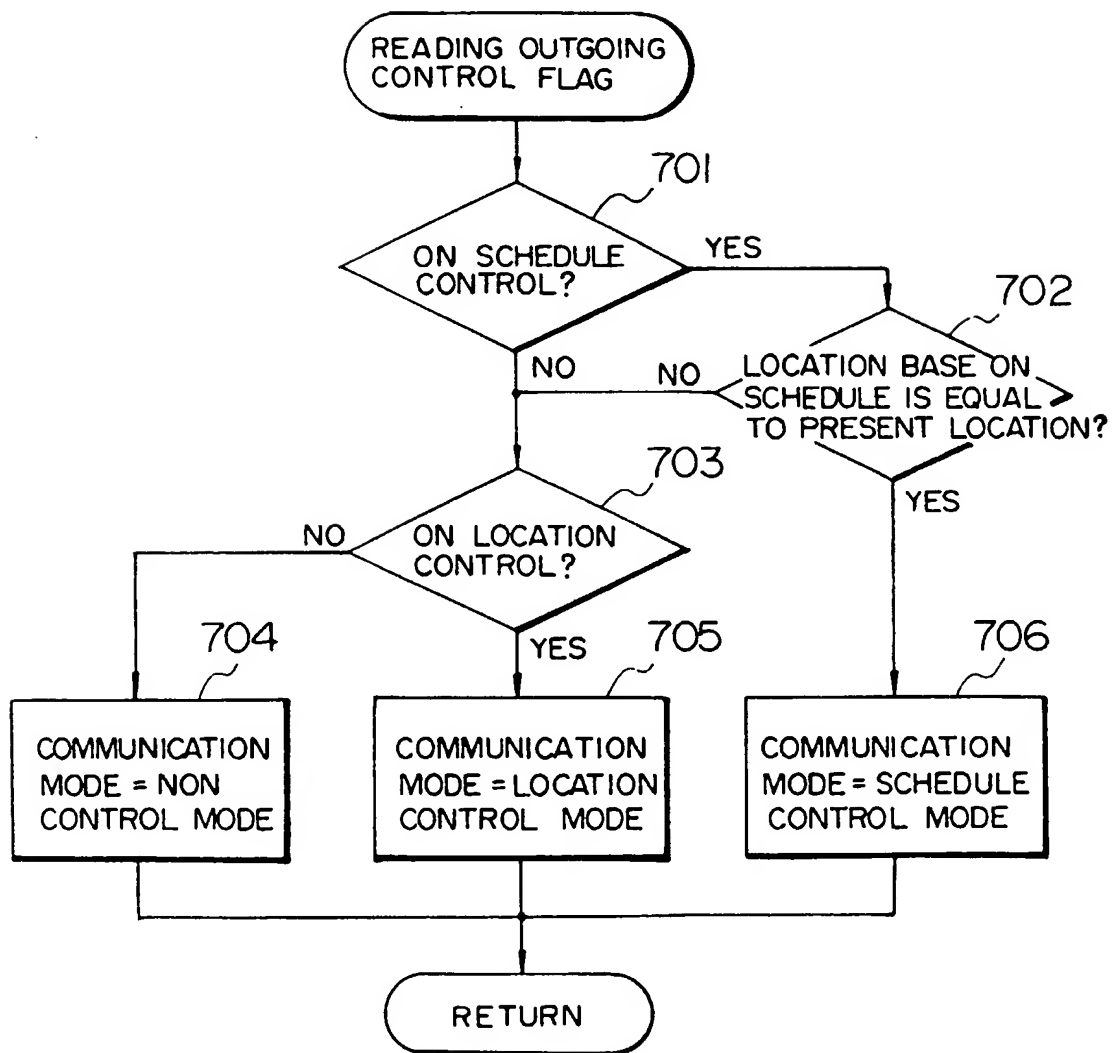




FIG. 25

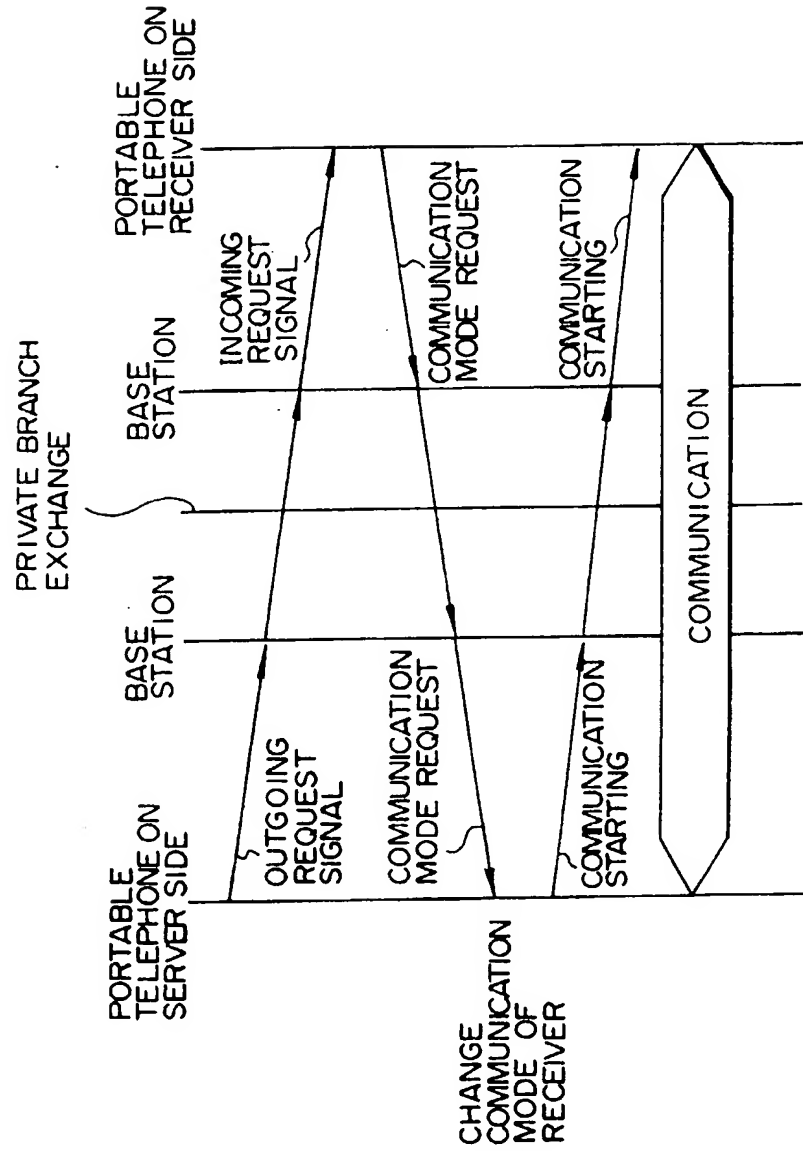
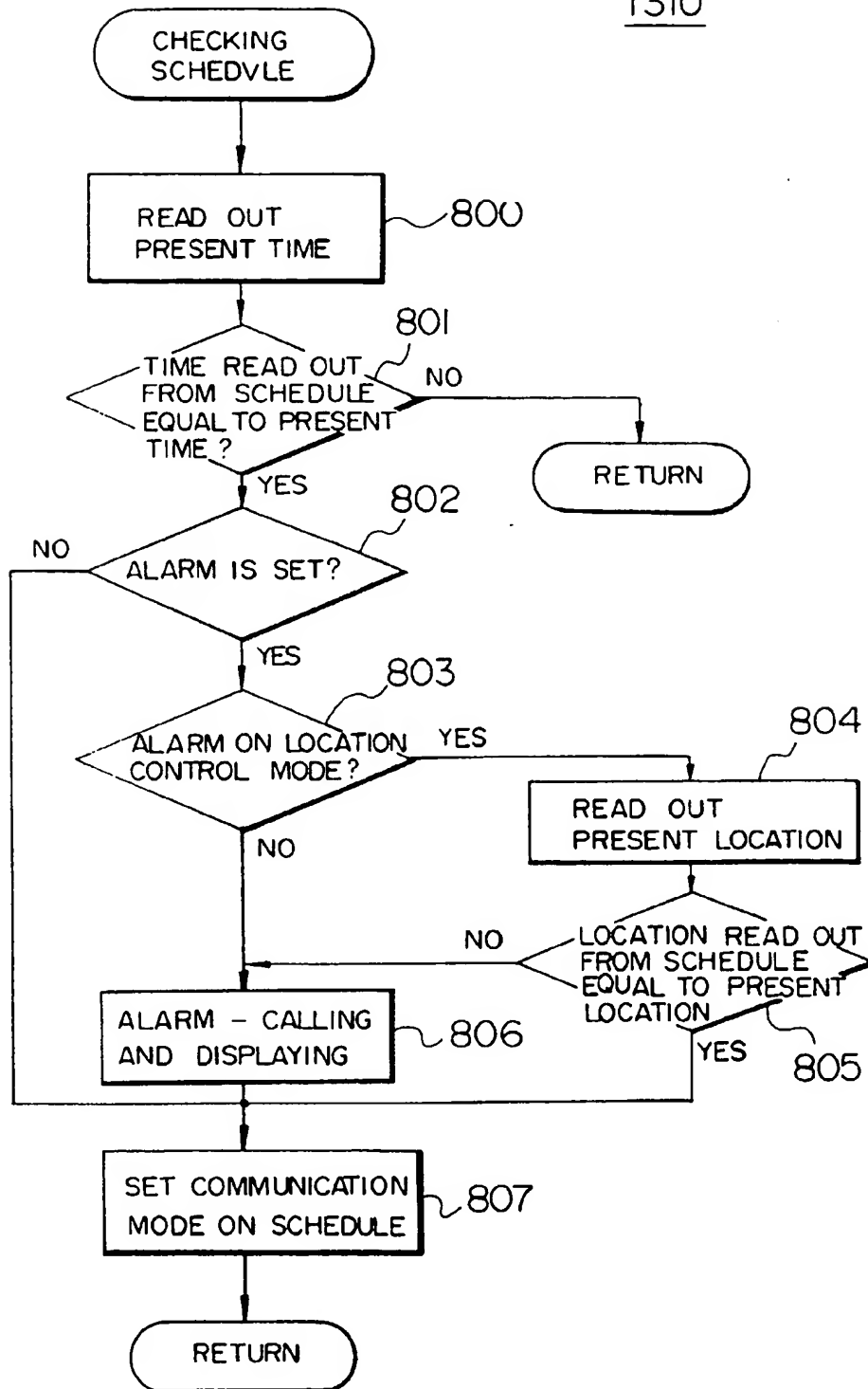


FIG. 26

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